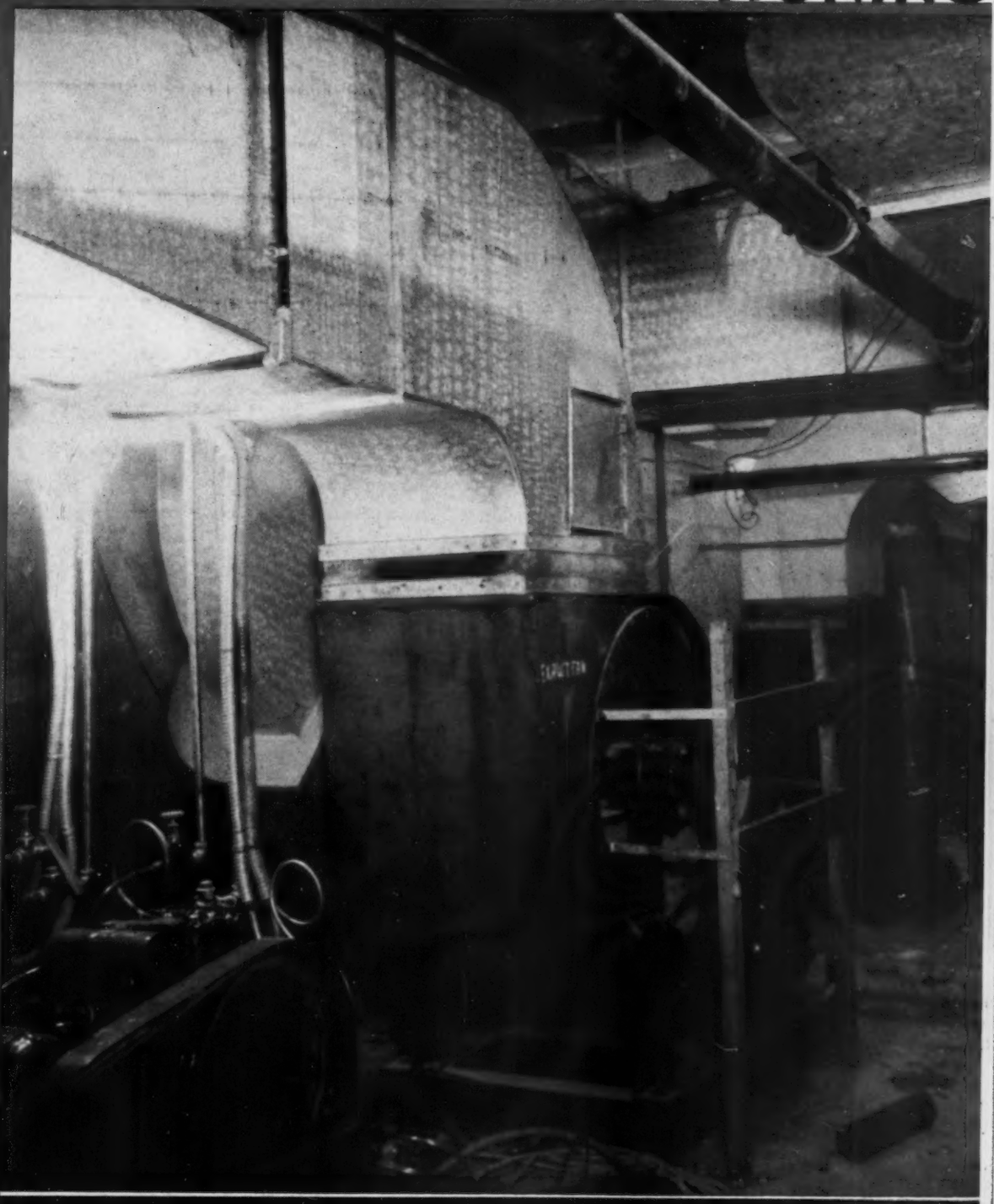
AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING

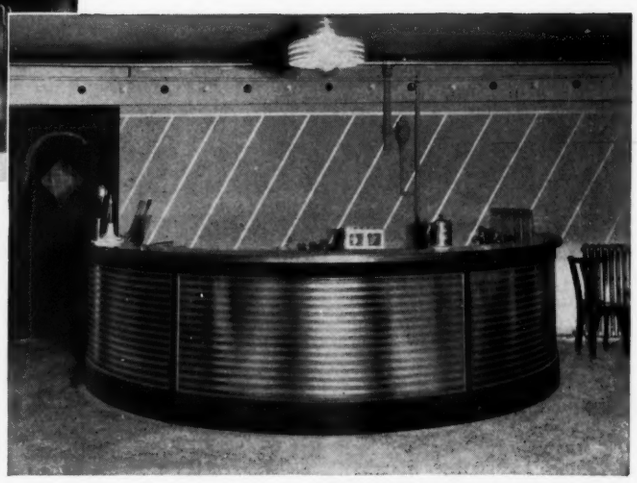


ABLISHED
8 8 0

UNE
935

THE AIR CONDITIONING SECTION

Page 27



Watch the work come in when you sell the lasting beauty of ENDURO

Every sheet metal contractor in the country has something today with which to attract new business—something he did not have only a few years ago. With it he can extend his field and see his efforts well rewarded. It is Republic ENDURO Stainless Steel.

Republic ENDURO is a silvery metal—beautiful in appearance, practically everlasting and not difficult to fabricate. It may be sheared, formed, bent, welded and soldered much the same as ordinary metals. Because of these qualities, it is being used today in the decorations of theatre and hotel lobbies and marquees, in the work tables and decorations of bars and soda fountains, in the kitchens of hotels, restaurants and institutions of every kind, and in the kitchens and bathrooms of private residences.

If you want to expand your business, write for samples of ENDURO and complete literature. Then look for new business in new places. Write today.

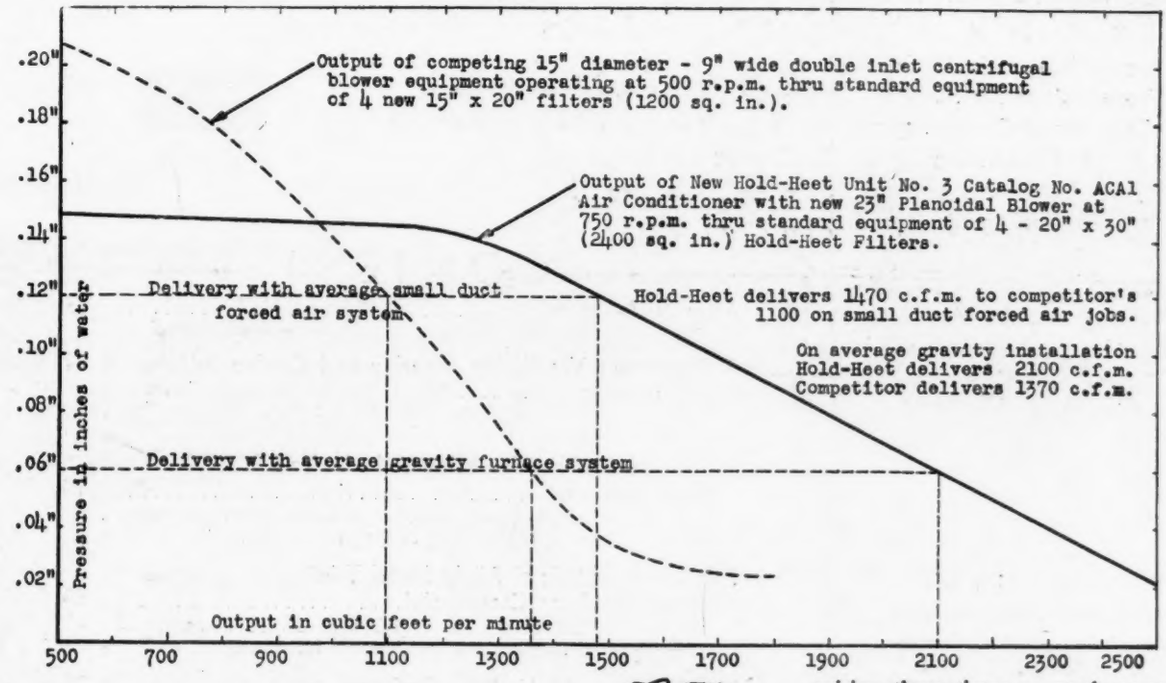
Republic Steel
CORPORATION

GENERAL OFFICES · · · YOUNGSTOWN, OHIO
CENTRAL ALLOY DIVISION · · MASSILLON, OHIO

REPUBLIC STEEL
ENDURO
REPUBLIC'S PERFECTED STAINLESS AND HEAT-RESISTING STEELS

Licensed under Chemical Foundation Patents Nos. 1316817 and 1339378.

Over All Competition Like a Tent



The above curves show an exact comparison of performance between the new Hold-Heet Unit No. 3 and one of the largest selling competing furnace blower units on the market for they were made on the same setup of testing equipment. Here is positive evidence that Hold-Heet performance is in a class by itself.

Hold-Heet Unit No. 3, Catalog No. ACA1

Complete assembled with 28" x 30" x 51" heavy rigid steel cabinet with enamel finish, 1/6 h. p. Ballentine Capacitor Motor with direct-connected 23" Planoidal Blower, 4—20" x 30" Hold-Heet Filters, Hold-Heet Rod and Tube Type Fan-Switch, Control Box with 100 speed control—all for Consumer retail price, f.o.b. Chicago, not installed **$84.25**

1. 100 Speed Control. Simply turn the control handle to increase delivery in cold weather or to "tune out" duct vibrations.

2. Noiseless Blower. Not a disk fan, not a centrifugal blower, but a Planoidal Blower fully protected by U. S. Patent No. 1,998,184. Absolutely noiseless in operation because two blades turning at a maximum speed of 750 r.p.m. give a beat frequency considerably below 30 per second, which is the minimum audible range of the human ear.

3. Ballentine Capacitor Motor. A 1/6 h. p., 8-pole, variable speed, capacitor motor such as Hold-Heet employs would cost competing manufacturers approximately four times what they actually pay for the cheap types of split phase motors that are used. The customer pays the difference in high operating expense, noisy starting, and the dimmed light resulting from the 20 to 25 ampere starting current as compared to the Hold-Heet starting current of 4 amperes.

4. 48% Static Pressure Efficiency. This remarkable efficiency may be best appreciated when one learns that the new blower recently heralded with much acclaim by one of the largest manufacturing and research organizations in the air conditioning field has a maximum static pressure efficiency of 15% in the useful operating range—requiring three times as much power as Hold-Heet to give less output.

5. Oversize Filter Area— Hold-Heet supplies 2400 sq. in. Compare this with the competitor who claims the 1200 sq. in. employed in his unit is 50% greater than is usually found on units of comparable size. Filter resistance varies with the square of the velocity. 2000 c.f.m. through 1200 square inches would have a pressure drop of .08". This same volume through the 2400 square inches Hold-Heet employs would have a pressure drop of only .02".

6. Free Gravity Circulation. It is vitally necessary that all furnaces employing solid fuel should have free gravity circulation or the heating plant may be ruined through overheating when the blower is not running. Hold-Heet insures free gravity circulation by oversize filter area, direct air passage, large port area, combined with a type of blower blade that does not obstruct the free passage of air.

7. Low Installation Cost. No sub-base is required, no expensive hood, no canvas connections. Hold-Heet saves on initial cost, on installation cost and on operating cost.

8. One Standardized Unit takes care of the 10-room house or the small bungalow. Simply adjust the 100 speed control to the output the job requires. Only one unit to stock—only one unit to sell—concentrate on Hold-Heet.

YOU Are Losing Money

if you do not have one of these new units which you can demonstrate. The quality and appearance is so striking, the performance features are so outstanding, the demonstration you can make is so compelling that countless prospects would buy *now* if they could actually see the unit in operation. Order your demonstrator now.

Write for discounts—use your letterhead.

RUSSELL ELECTRIC CO. 342 West Huron Street CHICAGO, ILLINOIS

Covering All Activities
in
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Ventilating
Roofing

AMERICAN ARTISAN

With which is merged

FURNACES AND SHEET METALS AND Warm-Air Heating

Vol. 104, No. 6 June, 1935 Founded 1880

CONTENTS

NRA MEMBER U.S. WE DO OUR PART

Published Monthly by
Keeney Publishing Company
6 North Michigan Ave., Chicago
State 6916

•

Branch Offices

New York
Room 1950
Grand Central Terminal Bldg.
Murray Hill 2-8293

Cleveland
2047 Rossmoor Rd.
Cleveland Hts.
Yellowstone 1540

•

J. D. WILDER
Editor

•

Advertising Staff
WALLACE J. OSBORN
R. PAYNE WETTSTEIN
ROBERT A. JACK

•

F. P. KEENEY
President
W. J. OSBORN
Vice President
R. PAYNE WETTSTEIN
Secretary
CHAS. E. PRICE
Treasurer

Member of Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Yearly Subscription Price—U. S. and possessions, $2.00; Canada, $3.00; Other countries, $4.00. Single copies, $.25. Back numbers $.50. Entered as second-class matter, July 29, 1932, at the Post Office at Chicago, Illinois under the act of March 3, 1879.

More than 7,000 copies of this issue are being distributed.

The Best News that FURNACE DEALERS EVER RECEIVED!

Here is your opportunity to sell Sunbeam Furnaces and Air Conditioning Units in the summer with no greater effort than is required in the Fall months.

Home owners can buy new Sunbeam equipment now—before vacations, before house cleaning, or just to have it off their minds—without paying one extra penny for postponing payments! The only financing charges are the low, government-approved F. H. A. rates.

Sunbeam dealers receive all their money as soon as the installation is completed. There is no hold-back. No waiting. No financial responsibility of any kind.

WE ARE CO-OPERATING — BETTER HOUSING PROGRAM

Return the coupon. Make June, July and August busy, profitable months!

THE FOX FURNACE CO. ELYRIA, O. A DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORP.

MORE FURNACE DEALERS SELL

SUNBEAM
WARM-AIR FURNACES

THAN ANY OTHER KIND

RETURN THIS COUPON TODAY

The Fox Furnace Company
Elyria, Ohio

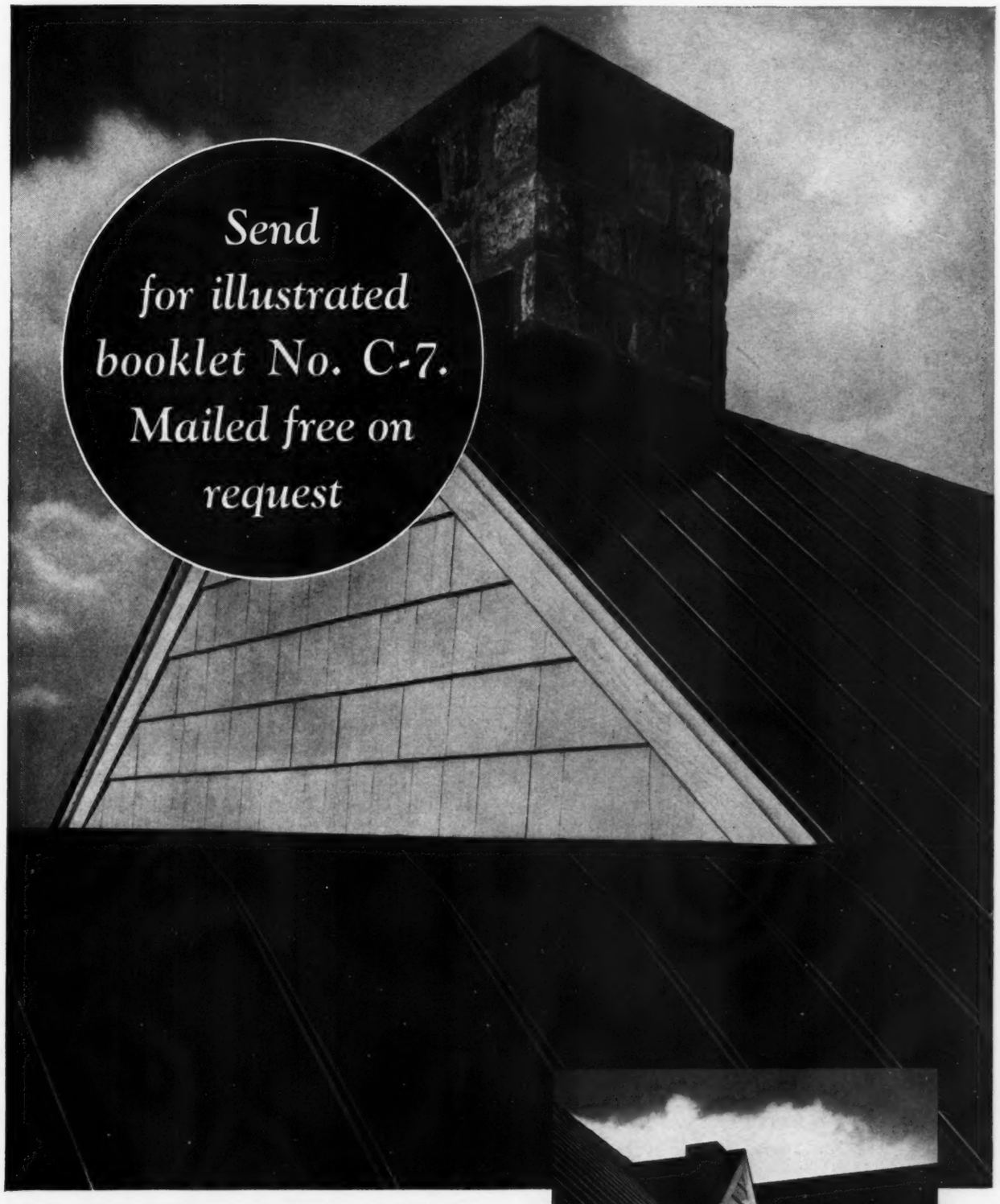
Please rush to us complete information on the Sunbeam Summer Finance Plan. Also give us the name of the Sunbeam jobber near us who carries a complete stock of furnaces.

Name .....

Address .....

City and State .....

A-6



The time seems right for promoting the use of Anaconda 10-oz. *Economy* Cottage Roofing. The public appears to be "copper conscious". The architectural profession is expected to favor this new type of roofing. And the National Housing Act will help tremendously. The cards are stacked in your favor for the first time in years. Play them . . . and win!

COPPER

Weather-proofed

with REVERE THRU-WALL FLASHING*

Revere, America's oldest name in copper and brass, presents a patented thru-wall flashing that is new in design, efficient in operation, and reasonably priced.

Material: The flashing is made of Revere Copper (soft temper) or non-staining Revere Leadtex (lead-coated sheet copper).

Design: Parallel ribs are rolled at 3-inch intervals along the full width of the flashing with embossings between each rib. The parallel ribs permit a water-tight interlocking joint with two-inch overlap to form continuous flashing without the use of solder, and the ribs also allow water to drain off quickly. The ribs and embossings make an unusually tight bond between mortar and flashing, prevent all lateral movement of the wall, and allow for expansion and contraction.

Adaptability: With most patented flashings, it is necessary to select several types to meet the ordinary flashing requirements. One of the principal advantages of Revere Thru-Wall Flashing is its adaptability. It is furnished in one type only . . . sheet form. All styles and sizes can be cut, bent, and formed from this sheet by the sheet metal contractor in his own shop with his every-day tools. Also, the flashing will not lose its original softness. Standard widths run from 8 to 36 inches. The length is 74 inches, which when laid up with two-inch overlap measures 72 inches.

Cost: Because of ideal manufacturing facilities and simplicity of design, the Revere Flashing is very reasonably priced. It is available through Revere Distributors in all sections of the country.

Note: Cheney Flashing is also available at Revere Distributors, and is reduced in price. These two flashings provide the proper protection for any and all types of construction . . . and you can assure your customer of a job that provides maximum safety and long-lasting durability.

For complete details and specifications on these flashings address our Executive Offices. **Patent No. 1,928,589*

Revere Copper *and* Brass

INCORPORATED

Founded by Paul Revere 1801

EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK CITY · MILLS: BALTIMORE, MD. · TAUNTON, MASS. NEW BEDFORD, MASS. · ROME, N. Y. · DETROIT, MICH. · CHICAGO, ILL. · SALES OFFICES IN PRINCIPAL CITIES

Now That the Financing of Furnace Installations Has Been Solved---

the manufacturers of the famous WEIR furnace have solved the Furnace Dealer's remaining problem:

A Quality Steel Furnace to Meet Today's Price Demand

Taking a leaf from the automotive book, we offer a GENUINE WEIR furnace at a price that is not prohibitive to even the most modest home.

This lower priced series embodies all the advantages of STEEL construction, plus riveting and welding as known to WEIR alone—all at a price only slightly higher than that of ordinary sectional furnaces, yet backed by a reputation for QUALITY that has always been associated with the WEIR.

Thus, our dealers are enabled to meet every consumer requirement from the finest domestic air-conditioning job with either coal, oil or gas fuel, to the ordinary installation decided on "price."

You should know the whole story of how the WEIR proposition fits into the trend of the times—for new home construction and old home modernization are "picking up" and you naturally want to be "right in there pitching for all you're worth" when the game gets really warm. Just send in the coupon attached to your letter- or bill-head.

The Answer to "How to Get the Cash"

We are prepared to finance your contracts for you thru our own Finance Company.

Lowest Rates.
No Down Payment.
3 Years To Pay.
No Red Tape.
No Delay.
No Reserve.
No Recourse.

Let us send you full details. Just ask for Bulletin FA.

THE MEYER FURNACE COMPANY

PEORIA, ILLINOIS

Established 1866—Mfrs. of

WEIR and MEYER Steel Furnaces—Domestic Air-Conditioning Appliances For Coal—Oil—Gas.

COUPON: We're Interested In The WEIR. Send Details.

Name .....

Address .....

City .....

Don't Guess...

when you buy Sheet Metal

You can't be too careful in making your sheet metal decision. Don't take chances. *Know* what is in the metal before you buy and you'll save yourself disappointment, dissatisfaction and money loss.

You needn't guess about the quality of GOHI Pure Iron-Copper Alloy. It has been produced on the same formula* for more than a quarter of a century, and is accepted by the most careful and exacting buyers as the longest-lived, wear-, weather- and corrosion-resisting low-cost ferrous metal. You'll make no mistake when you specify GOHI for all sheet metal work, whether your requirements are a bundle or a carload.

GOHI Pure Iron-Copper Alloy is available in all sizes and gauges. Produced exclusively by The Newport Rolling Mill Company Newport, Kentucky.

GOHI

**Typical analysis and complete information on request.*

PRONOUNCED "GO-HIGH"

SHEET METAL

THE NEWPORT ROLLING MILL COMPANY . . . NEWPORT, KENTUCKY

AMERICAN ARTISAN

Volume 104 Number 6

After NRA—What?

LAST month the Supreme court of the United States declared NRA and the delegation of code power to the President unconstitutional.

The question in everyone's mind is—"What now?"

Some men in the industry feel that the passing of NRA means the end of all constructive effort. Others welcome the change and anticipate better business conditions. Actually, all opinions are merely personal conjecture.

In order to form an opinion, let us consider for a moment some of the aspects of the situation. NRA and the codes of fair competition were conceived on the basis of a few fundamental principles—to put men back to work; to pay fair and living wages; to reduce the hours of labor; to eliminate those unfair practices which tend to reduce profit and fair play.

If we recall the progress of code formulation—not only our own code, but the codes of other industries—it is evident that some of these basic aims were lost sight of in the argument when every faction was striving for some personally considered advantage. Furthermore, in industries like ours, hours of wages were not found important because few contractors had enough work to keep the shop open 40 hours a week. Union wages were already established. Open shop wages probably were raised, but where and how much is still open to speculation.

◆

Let us recall, also, that the industry was supposed to set up a method of cost keeping whereby established boards might judge whether bids were fair. This never was accomplished. That our industry put more men back to work is open to question. Practically all our battles hinged around the unfair practices. Right up until the end local, state and national groups were bitterly arguing over what is fair and what is unfair practice; how costs should be allotted; how to get rid of the chiselers, connivers, price cutters. And of course we cannot forget the arguments over the National Code Authority, over the assessment, over enforcement, over bid depositories; to mention a few of the subjects of controversy.

An overlooked truth, we think, is that contracting has always been based upon the premise that to contract you must bid. That to bid successfully you must bid low. That to bid low you must find corners to cut, play politics, log roll, collude—preferably honestly, but sometimes pretty close to the limit of the law. If we grant this premise we can appreciate the task of setting up codes in the contracting industries.

What now?

◆

Two paths of action lie before us. The first path is that of voluntary, cooperative effort. In other words—association activity. The other is personal effort. Some say the industry can be persuaded to abide by the good features of the code voluntarily. Only the future can prove the contention.

But the path of personal effort puts the problem squarely up to every contractor. If he is a non-cooperator, lazy, shiftless, a constant objector to anything and everything—but honest—he probably will succeed to the extent of his own ambitions. If he is these things—but dishonest—time and public disapproval will take care of the final settlement.

The man who is honest, energetic; who studies and applies the things he learns, finds his price level and his sales volume dishearteningly circumscribed by the price cutters of his community.

What can he do about the situation?

During the last few years this type of contractor has been subjected to much unjust criticism. "He is a mechanic; not a merchandiser" has been a popular condemnation. He has been urged by manufacturers to emulate the selling tactics of the automobile and specialty sales agency—to advertise, to employ high pressure salesmen, establish an elaborate sales room. Excellent in theory, but not always so practical in application. Sometimes manufacturers, in their drive to extend their volume, forget that specialty agencies have exclusive franchises, expensive dealer helps, financial cooperation. It is commonplace—not unusual—for a dealer to develop a sale only to lose it to another who cuts the price and sells the same article.

Manufacturers also forget that the specialty, high pressure sales agency is oftentimes here today and gone tomorrow. The legitimate contractor has a reputation, he bears the responsibility year after year. He cannot afford practices, nor can he sell products, which jeopardize this painfully established reputation.

We maintain that the established contractor is usually a good salesman. Isn't a sale more satisfactory when made legitimately, but made to satisfy, than the sale high pressured and forever after cussed? If our industry is not sales-minded how can we account for the 130,000 furnaces sold in 1934? Or for the tens of thousands of filters, controls, fans, accessories sold last year?

◆

In the light of these facts we propose a plan—simple in theory, applicable to present circumstances, immediate in its possible returns.

It may be summed up in six words—"New sales to your old customers."

The plan is not new. Hundreds of contractors have used it already. Nevertheless it has inherent advantages. You know your old customers. They know you. They should have confidence in your recommendations. They can find you today, tomorrow and next year. You won't sell them a bill they cannot afford. They will accept your statements on the quality, price, advantages of the product offered.

Consider a specific example. A customer has a good gravity heating system. It provides plenty of heat. It has never given a moment's trouble. But you can give that customer much more. You can readily explain such advantages of mechanical air circulation as lower ceiling and higher floor temperatures; more satisfactory heat from less fuel; positive cleaning of all the air within the house, elimination of dust and pollen.

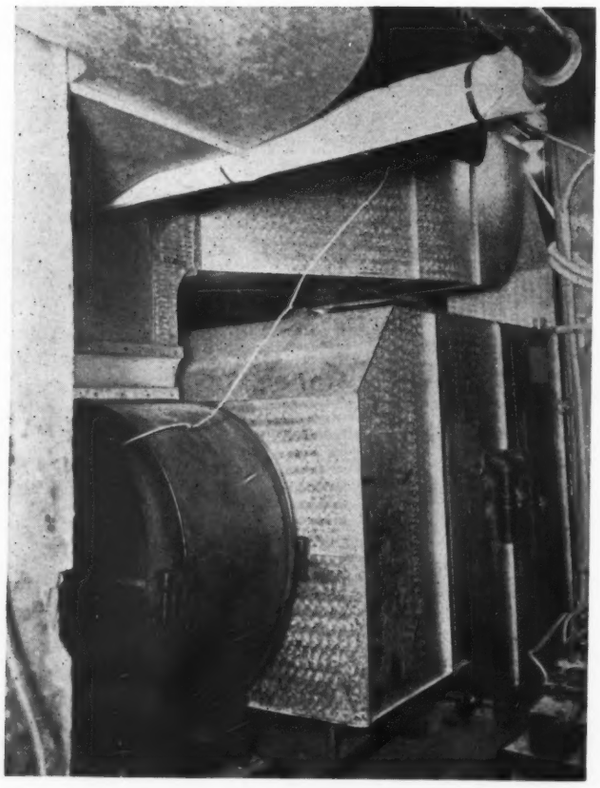
◆

Your customer probably wants better humidification. You can sell humidification up to the limitations of his house and explain what should be done to carry more humidity in cold weather. Positive control of the entire heating plant, with resultant saving in fuel cost, more even temperatures, greater comfort. Perhaps a modern furnace will give greater comfort at less cost and pay for itself.

Or consider cooling. Everyone is interested in cooling. Too few can afford what they have in mind, but you can sell what they can afford and save your customer the regrets attendant to buying a useless "gadget." There are numerous degrees of cooling which you can sell any one and explain their limitations.

So, also, with roofing and general sheet metal work. Every block has houses needing roofing and sheet metal repairs. "Sell today, be gone tomorrow" has long been the slogan of the fly-by-night reroofer. You know the problem and the possibilities far better than we do.

This, in outline, is the plan. It can be restricted to personal solicitation or enlarged to include advertising, direct mail, telephone solicitation, personal calls—as you will. If every contractor will sell every fifth old customer one new improvement, business for this industry will never need NRA.



The restaurant supply fan, heating coils, filter housing with space for future cooling coils.

Design Details for a Restaurant Ventilating, Heating and Cooling System

By G. H. Laws

The Charles Hartmann Co.,
Brooklyn, N. Y.

IT IS said that "the proof of the pudding is in the eating thereof." The value of a ventilation or air conditioning installation is determined by the degree of its efficiency in performing the work for which it was designed.

Many so called ventilating systems do not give the desired results because of faulty design, or poor workmanship, lack of attention to details in constructions, etc.

It will be noted from the drawings, that this installation was made in a restaurant and the kitchen serving it. The kitchen ventilation consists of both exhaust and supply. The restaurant system consists of supply only, with recirculation, and is designed for future operation as an air conditioning system, with refrigerating equipment to be added.

During the winter season, it operates as a heating and ventilation system.

It will be noted from the accompanying drawings, that the floor area of the kitchen is very limited and in order to provide sufficient exhaust and fresh air to maintain comfortable working conditions; that is, to remove cooking odors and heat from two gas ranges, gas charcoal broiler, steam tables, toasters, etc., this system was designed to give a one minute air change in the kitchen area, i.e., 4500 c.f.m. exhaust and 4000 c.f.m. supply.

The volume of air supplied is purposely less than that exhausted in order to produce a slight suction or negative pressure. An open service counter, with an opening in the wall between kitchen and restaurant approximately 12 feet wide by 5 feet high, necessitated a balanced air movement in the kitchen in order not to interfere with the proper functioning of the independent system in the restaurant section. Too strong an exhaust would draw conditioned air from the restaurant, thus imposing an unnecessary load on the refrigeration equipment, to make up for the conditioned air thus lost. On the other hand, an improperly balanced fresh air supply to the kitchen would increase the possibility of spreading odors to the restaurant area.

Approximately 3000 c.f.m. of air

View of restaurant showing kitchen at rear and an outlet plaque in ceiling.

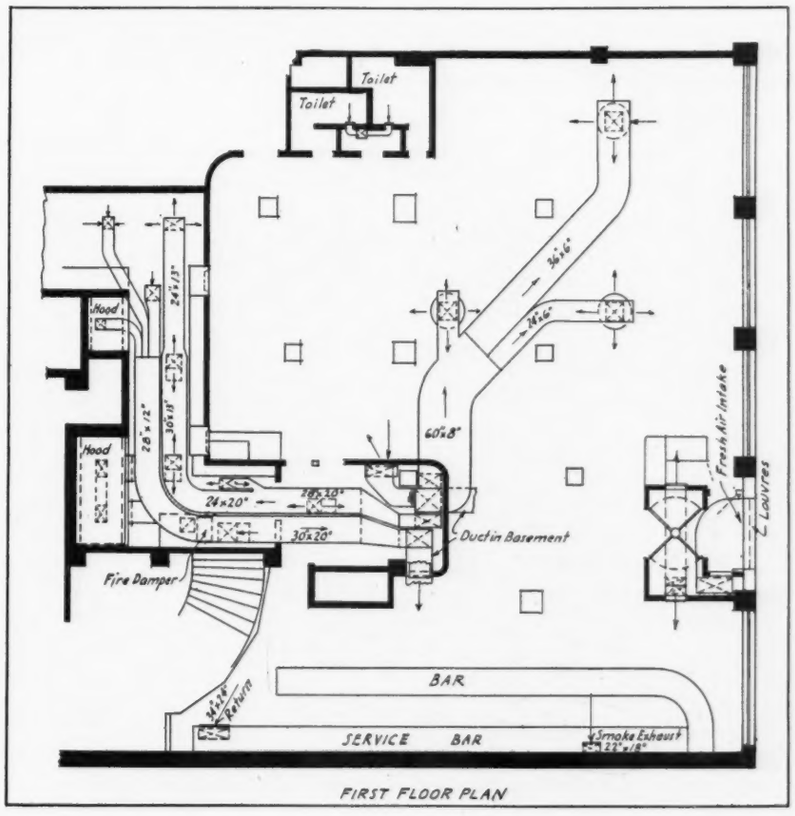
Basement view in dish washing room showing typical ducts and an exhaust system for the dish washer at right.

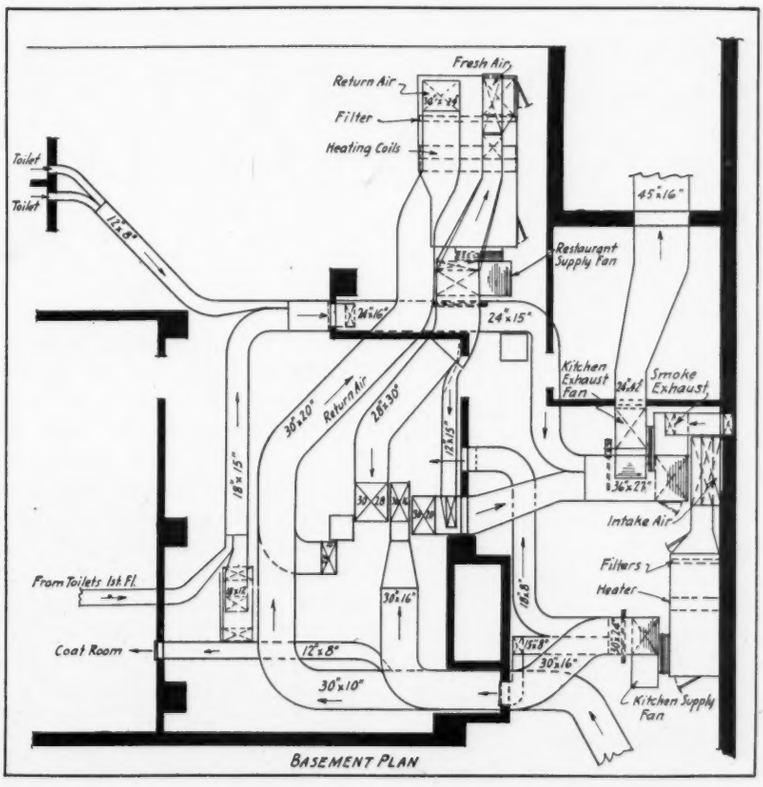
is exhausted through the hood over the ranges and the balance through the hood over the charcoal grille and ceiling outlets. Diffuser plaques 4 inches under the ceiling supply outlets are provided to prevent objectionable direct air currents.

Hoods

The hood over the ranges is of double shell construction with the bottom edge of the inside shell approximately 6 inches above the outside of hood proper, and 4 inches less in width, thus providing openings 2 inches wide along the front and back, full length of the hood. Two slide door type openings are in the top section of the inside shell to provide the balance of exhaust openings required.

Hoods of this type have been found superior to the common type of single shell hood usually installed over ranges because of the high velocity of exhaust attainable over the entire area of the ranges. This is necessary to eliminate the escape of heat and odors.





The kitchen exhaust fan handles, in addition to the above, approximately 2400 c.f.m. from the basement area, where 2200 c.f.m. of fresh air is supplied.

The exhaust from the dish washing machine is direct connected to both the inlet and outlet of washer. This type of exhaust is more effective than the usual single hood and prevents the escape of steam.

Above—the first floor plan and, below—the basement plan of equipment and ducts showing location of apparatus, duct sizes and risers. Note that there is a complete fresh air intake system, a kitchen exhaust system, kitchen supply system, and restaurant warm air supply system. The text explains the design features and plan of operation.

A fire damper is provided in the exhaust duct with a 360° fusible link.

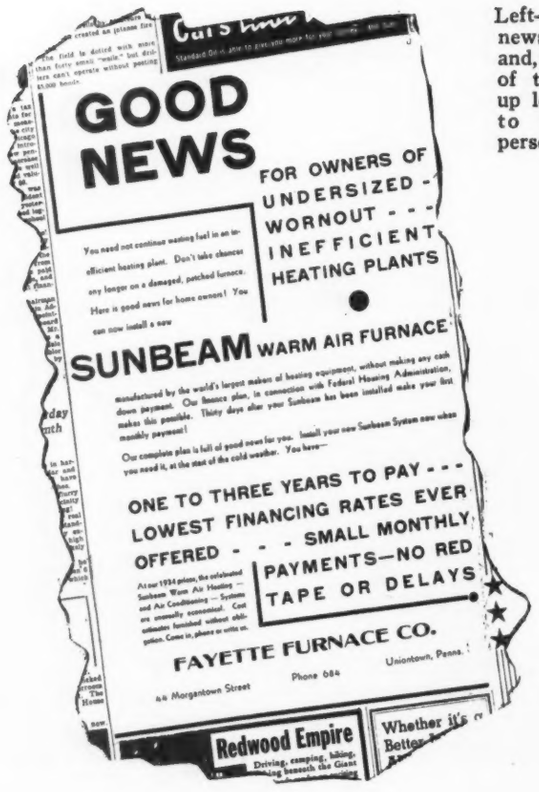
The fresh air for the restaurant system is taken through a louvred opening over the main entrance door at street level and enters a chamber directly below, to which the return air duct from the restaurant is also connected.

Manually adjustable louvre dampers are provided at each connection to control amount of fresh air, and recirculated air from the restaurant. All air to fan is filtered.

The restaurant fan supplies approximately 7000 c.f.m. Heating surface consists of two sections of finned tube coil with 4 foot 6 inch tubes, sized to temper 4500 cubic feet of air from zero to 95° F.

The steam supply to the preheating coil is controlled by a motorized steam valve, actuated by a thermostat located in the fresh air intake. This is set to allow steam to enter the coil when the outside temperature drops to 36° above zero and shuts off when the outside temperature rises to 41°.

(*Continued on page 74*)



Left—A typical newspaper ad and, right—one of the follow-up letters used to augment personal calls.

FAYETTE FURNACE CO.

44 Morgantown Street

SUNBEAM

Phone 684

Uniontown, Penna.

Mr. and Mrs. John Jones
875 Prairie Ave.,
Uniontown, Penna.

Dear Mr. and Mrs. Jones:

It is Surprising .....
The Number of Wasteful, Out-of-date Heating Plants being Replaced This Year:

There's a world of difference between modern heating systems and those built ten years ago. In fact, there have been just as many improvements in heating equipment, as in motor cars and radios.

The newer systems, like the Sunbeam, burn less fuel; give more heat; need less attention and provide clean heating. Streaky walls, darkened wall paper, dirty curtains and drapes are things of the past.

It is surprising ..... the large number of homes in which modern Sunbeams are replacing out-of-date heating plants. Convenient time payment terms make it easy to acquire a new heating system. You make a small down payment and discharge the balance in monthly installments that you hardly notice.

But the big reason why so many people in your community have changed is because we have been able to show them that the maintenance cost of a Sunbeam, which is the last word in heating efficiency and economy, is decidedly lower than that of a wasteful, old-fashioned heater.

Let us tell you of some of the recent developments in home heating.

Yours very truly,

S B Koidanov

"We Advertise F.H.A. Financing and Try to Be As Good Salesmen As the Specialty Man"

By S. B. Koidanov
Fayette Furnace Co.

THE Fayette Furnace Company of Uniontown, Penna., is not an old organization, being established two years ago. Prior to that time, the writer was associated with the Holland Furnace Company, where he received good training in the art of selling warm air heating equipment. Since establishing our business, this knowledge has been continually applied and it undoubtedly explains why, during the years of the depression, this organization has done a volume business in furnaces when many of my friends in the heating industry have been complaining about the scarcity of business.

Last year in the city of Uniontown, which has a population of 19,544, we sold well in excess of 100 furnaces. No small part of these results can be attributed to the fact that ours is anything but a back alley sheet metal shop.

Every day customers walk into our attractive display room, on one of the main streets of Uniontown. It is right across from a prominent mail-order house and enables us to meet cut-throat competition halfway instead of only complaining about it. Uniontown is situated in a bituminous coal mining area, and, as every one knows, the bituminous coal industry and all those affected by it has not been enjoying very prosperous conditions.

Sales Policies

It is our policy that before we sell a furnace to a prospective buyer, we first find who and where the prospect is. We have three plans for locating these prospects.

The primary method of location is by door-to-door personal canvassing. We appreciate full well the drawbacks of canvassing. We hear that housewives are so harassed by doorbell ringers that they either do not answer or else they quickly close the door in the face of the canvasser. I cannot truthfully say that whenever one of our men appears at a door the housewife recognizes he is different from other doorbell ringers; but our canvassers are so trained that they sell the housewife on answering a few leading questions.

There is nothing unique about our procedure. The canvasser's job is to get into the basement and learn the exact condition of the furnace. He gains his entrance by (1) offering free inspection of the heating plant (2) offering to make minor adjustments to such things as the damper regulator chain (3) by telling about our special low priced furnace cleaning offer, which the owner will wish to take advantage of if we find their heat-

ing plant needs cleaning. If, after his inspection of the furnace, he finds that a new heating plant is needed, he asks the housewife for permission to measure the house and to make a survey of the heating requirements.

The story is that from the survey, the company's heating engineer will make a heating plan, and the canvasser and the engineer will call back in a day or two with the plan and a cost estimate, stressing that no obligation to purchase anything is implied. The second call or "closing call" is generally made a couple of days later in the evening when the husband is at home, as it has been our experience that a purchase which amounts to the sum involved in the new heating system, must be decided jointly by husband and wife. I generally go along on these closing calls and close the sale. It is our policy that I hold myself in readiness for the signing of actual orders rather than spend my time locating suspects or prospects.

Advertising

During the course of the year, we will average three canvassers who are paid a commission, the commission being a certain percentage of any sale for which they located the prospect. In time I expect that some of these canvassers will develop to the point where they can close their own sales, in which event they receive a double commission, one for locating the prospect and the second for getting the signature on the dotted line.

We make constant use of dodgers or handbills, furnished by the manufacturer from whom we obtain our furnaces. These dodgers are distributed by the canvassers by one of two methods. The first method is to distribute the dodger in the morning and then call back in the afternoon or the next morning at the houses which received

S. B. Koidanov, Manager, The Fayette Furnace Co.

them. Under such a procedure, the dodger serves as sort of introduction to the canvasser's call. The second procedure is to have the canvasser hand the dodger to the housewife when she opens the door.

Our second method of locating prospects is through advertisements in our local newspapers. We use several types of advertisements. A certain number of prospects reveal themselves to us either by phone or by coming to the store as a result of these newspaper ads.

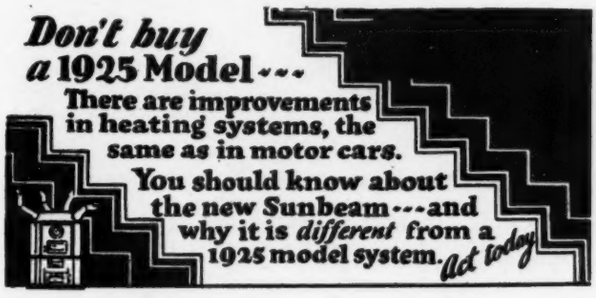
A third method of locating prospects is by advertisement in the classified section of the local telephone directory. Our canvassers and our newspaper advertisements may not reach some home owners just at the time they are looking for a furnace man. At such a time these people probably turn to the telephone directory for the name of someone who will repair, clean or inspect their heating plants.

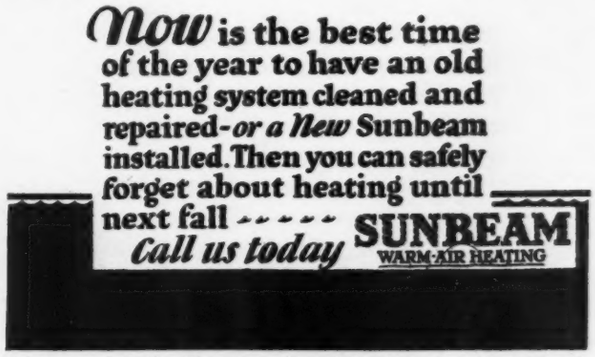
Another thing we find is that many people who are actual prospects cannot be persuaded to purchase at the time that we are trying to obtain the order. Most of these people are highly desirable prospects who must buy from us or some other heating contractor in the near future. There is a limit to the number of personal follow up calls we make on these prospects. A salesman may become a pest if his personal follow up is too persistent. In combination with a few personal calls, we keep our name and the need for new heating equipment or repairs before these prospects through a series of eight attractive, colorful government post cards furnished by the furnace manufacturer. If the prospect will make up his mind in a month, we send him eight messages at intervals of approximately three days. If the prospect will not buy for eight months, we reach him with one of these reminders once a month for that period. We also have a series of four letters which we can use for this purpose.

Give Service

I have drilled into my canvassers and my mechanics the necessity of always showing the customer a pleasant, cooperative, helpful attitude. This is mighty important. If such a small thing as a door is not closing tightly on a furnace, a damper is sticking or is not adjusted properly, if the damper chain is not adjusted correctly, all of our men correct these things gladly, letting the housewife know, of course, that they did the work and that they are only too pleased to have had the opportunity of doing it.

(*Continued on page 70*)





Above and Left—Two samples of black and red post cards which are mailed in batches of eight on a time schedule to keep the company's name before prospects between salesman's calls. These are manufacturer's literature.

Fabrication Details of Bright Metal Trim for A One-Story Commercial

THE accompanying pictures show a block completed a few months ago for E. H. Peters Inc. and leased to Wegman Bros., local retail food merchants. The engineer was Fred F. Gordon, the architect, Gustke and Pioch, the general contractor Arthur R. Koerner and the roofing and metal contractor, Fred H. Kimmel.

As the pictures show there were three major ornaments to be fabricated and installed, the two upper cornices extending the full length of the building about 80 feet and the lower unit just above the door about 6 feet long. The material finally chosen for these ornaments was low carbon, 18-8 stainless steel, No. 7 finish, one side and No. 2B finish the other side.

Fabrication

The sheets were purchased finished and to protect this finish, the metal workers used soft fabric gloves, the benches were covered with flannel and the brake edges were taped with white adhesive tape. This tape, of course, had to be changed a number of times on account of the cutting action. The top ornament below the coping face (Fig. 1) was made up in single pieces, each overlapping the next. A wood backing was used for support, stainless nails being driven through the bottom of each piece into the wood.

The center ornament and face pieces (Fig. 2) were made in 8 foot strips. A die was made to notch the strips, a small foot press serving as the die holder. After notching the strip was broken up on the brake over a piece of pipe. On account of the hardness and springiness of the material, about one-half again as much time was used in the

Closeup photograph of doorway showing window head moulding and ornamentation above the door; also window frames and kick plates. Above—exterior view of the building showing the cornice moulding, window head moulding and window trim.

notching and forming as compared with ordinary steel. The strips were attached by means of ⅛-inch diameter stainless rivets about 12 inches on centers to a 2-inch x 1-inch x 26 gauge stainless angle which was screwed to the horizontal wood piece. The door ornament was made up by hand in one piece and nailed to a wood backing.

Lighting Troughs

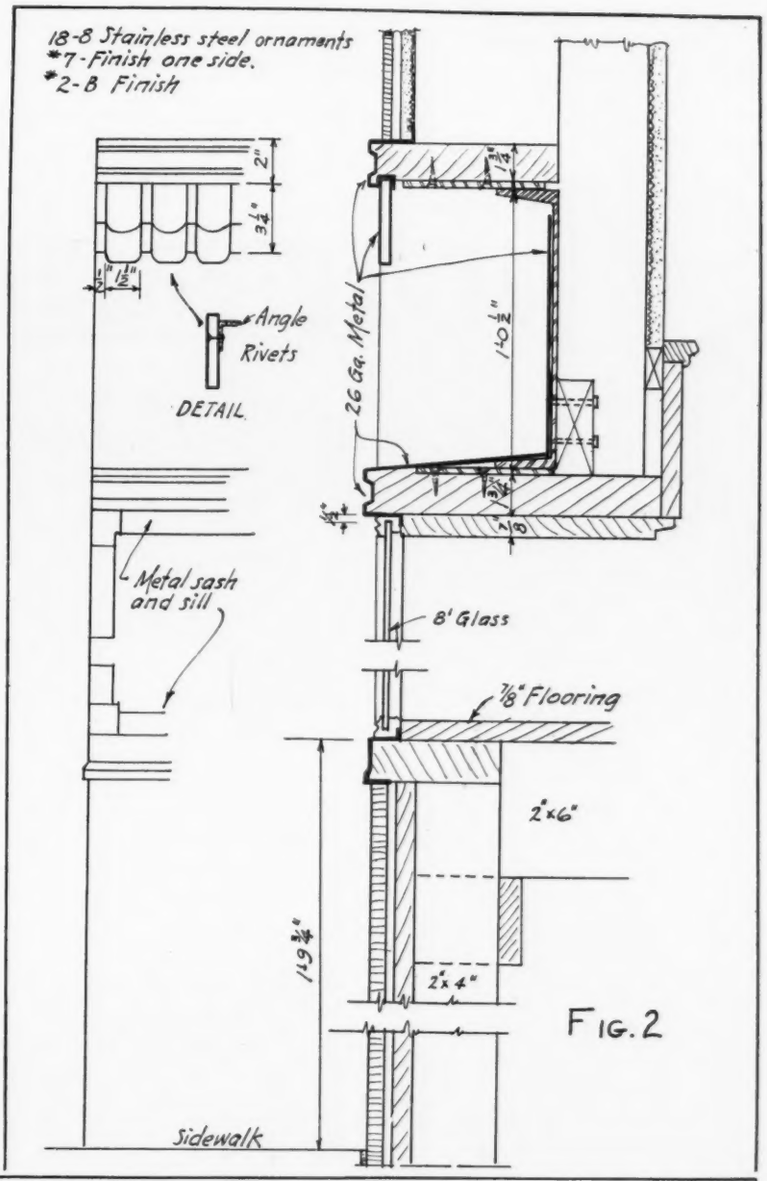
The horizontal coping and flashing metal was lead coated copper and the reflectors both inside and out the store were ordinary galvanized steel treated and painted flat white.

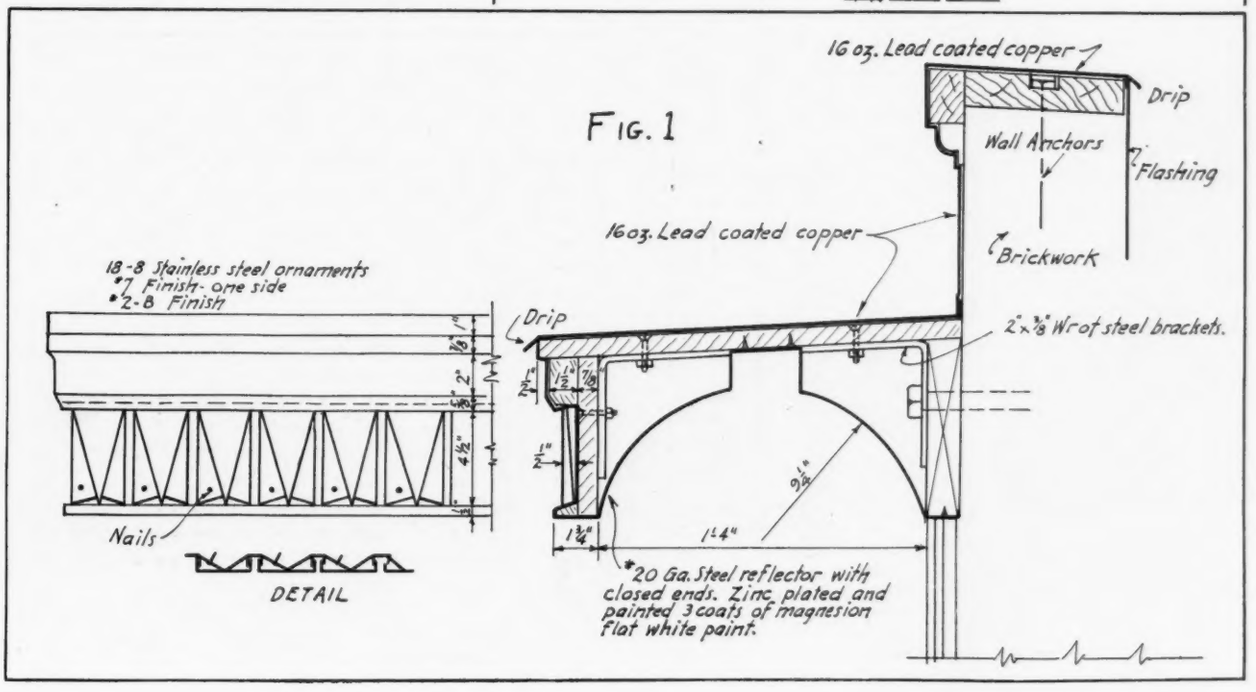
The lighting effect due to the inside and outside reflectors serves to show up the high metal finish to good advantage. A recent inspection of the metal finish showed no corrosion and indications seemed to point to a long life of high polish finish to blend with the varied colored structural glass facing.

Fig. 2—Details of fabrication for the window head moulding which frames and ornaments the awning recess. Note application of the ornamentation and only partial coverage of the lower edge sheet at the back of the recess.

◆

Fig. 1—Details of the coping face and cornice head (of lead coated copper) and ornamentation along cornice face of bright metal. Note the galvanized steel reflector trough with special paint treatment.





OPEN for DISCUSSION

Readers are invited to contribute their experiences or suggestions to the topics under discussion. Sketches showing your ideas are desired.

Projection of Air from Registers

By G. A. Voorhees
Engineer, The Furblo Co.

KONZO'S article in your May issue is by far the best thing I've ever seen on this subject of the projection of air jets from registers.

I'm afraid, however, that his quoting of Professor Tuve's tests might leave the impression in the minds of some readers—that the distance to which an air current will be projected into a room from an air supply outlet depends wholly on the velocity of discharge.

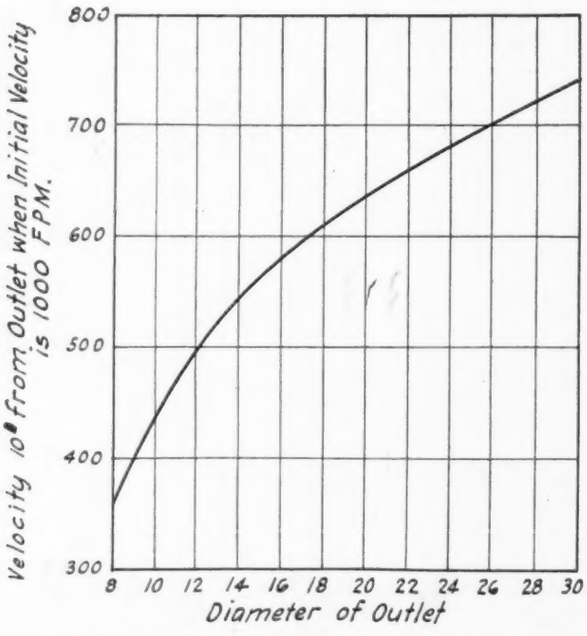
The diameter or width of the outlet and consequently the *mass* of air injected into the room also affects the distance which this current will traverse and still maintain an appreciable velocity.

During a period of several years, when I was handling quite a number of church heating jobs and similar installations, I accumulated quite a mass of data based on tests made of these systems in an effort to determine (among other things) at what velocity air would need to be projected into an auditorium in order to "carry" a given distance before being dissipated by turbulence resulting from the resistance of the room air.

The first snag I hit in trying to make these tests was that the current or jet of air from the register had a pronouced tendency to rise because of its higher temperature and since many of my installations were in churches and other intermittently heated buildings. I made it a point to test the various outlets in these buildings at different blower speeds (so as to obtain different outlet velocities), I found that if I attempted to make the tests with heated air issuing from the register, I could not get comparable results unless the air in each case was at approximately the same temperature.

I found that by making tests without fire in the furnace, so there was not a great difference between the room air temperature and the temperature of air leaving the outlet, I could not only compare re-

(*Continued on page 71*)



This chart shows a 1,000-foot velocity for 13 outlets read at a distance of 10 feet from the register. Note relationship between size of outlet and velocity. The more air—the farther the air carries.

VELOCITY OF AIR CURRENT AT VARIOUS DISTANCES FROM SUPPLY OUTLET
BASED ON 1,000 F.P.M. OUTLET VELOCITY

DIAM. OF OUTLET INCHES	DISTANCE FROM OUTLET-FEET										
	5	10	15	20	25	30	35	40	45	50	60	70
8"	580	360	210									
9"	620	400	260	150								
10"	640	450	300	200								
12"	680	490	360	260	160							
14"	720	540	410	320	230	140						
16"	750	580	450	360	280	210	130					
18"	790	610	490	400	320	260	190	120				
20"	810	650	520	450	360	300	240	180				
22"	840	660	550	460	390	340	280	220	170	110		
24"	860	680	580	490	420	360	310	260	210	160		
26"	900	710	600	510	450	390	340	290	240	200	100	
28"	1000	720	610	540	470	420	360	320	270	230	140	
30"	1000	740	630	560	490	440	390	340	300	260	180	110

Tabulation above shows Voorhees' velocity readings for various outlets at increasing distances from the register. All readings at initial register velocity of 1,000 F.P.M.

Development of a Rectangle Pitched Hood by Triangulation

By William Hart
Instructor, Frank Wiggins Trade School
Los Angeles, Cal.

BECAUSE of the increasing demand for irregular forms to be made by the sheet metal worker, triangulation is an important factor in the development of sheet metal patterns.

To most students triangulation is a difficult subject. However, this need not be so when the fundamentals underlying triangulation are properly understood. To aid in visualizing just how irregular articles are divided into imaginary triangles the student is advised to make a cardboard or sheet metal model of the following problem. This may be accomplished by securing a piece of cardboard or sheet metal four by five inches, the form of which will represent the plan as shown at Fig. 1; then draw in the hip and seam lines. Next draw and cut out five right angle triangles as follows:

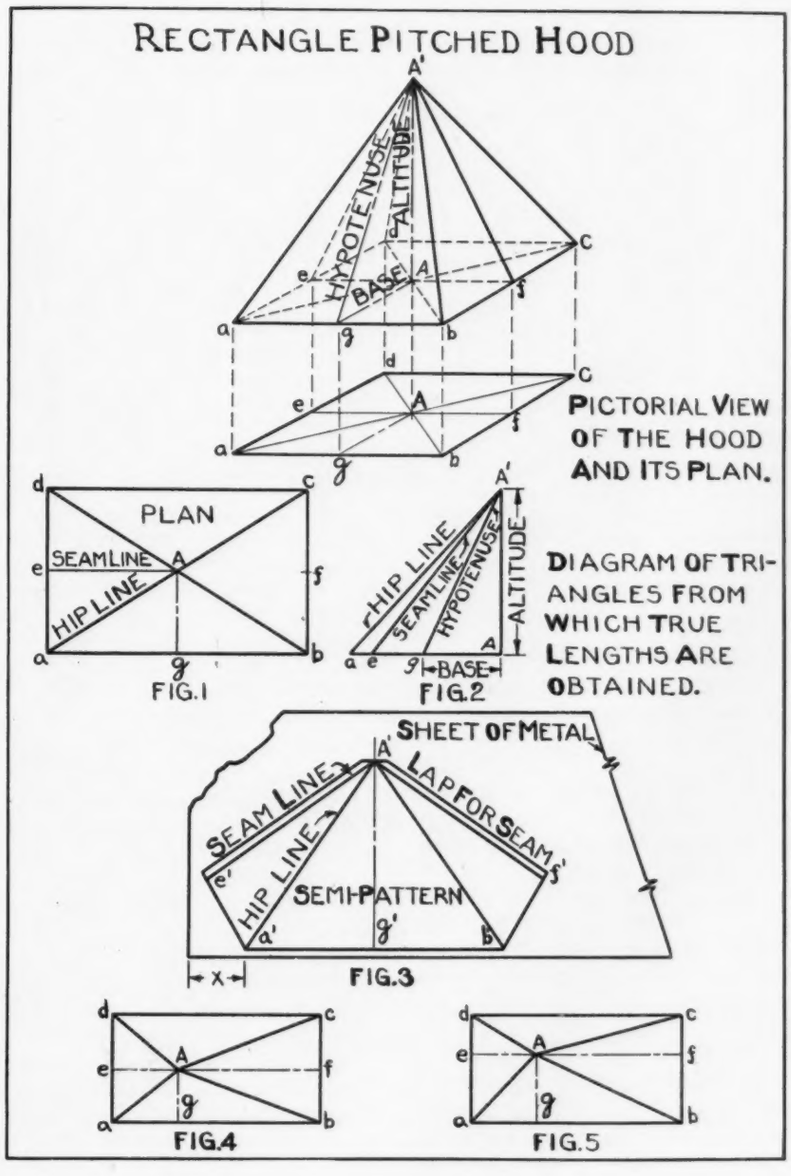
The altitude of the triangles equals three inches, the base of triangle 1 equals two inches, the base of triangles 2 and 3 equals $3\frac{3}{16}$ inches, and the base of triangles 4 and 5 equals $2\frac{1}{2}$ inches. Arrange these triangles directly upon their corresponding lines in the plan.

Fasten the base of triangle 1 on the line A-g as shown in the pictorial view of hood. Attach the base of triangles 2 and 3 on the hip lines A-a and A-b. Fasten triangles 4 and 5 on the seam lines A-e and A-f.

Triangulation as applied to sheet metal pattern drafting is a system of flexible triangles, and is used in developing the surfaces of irregular articles where the projection or radial line method cannot be conveniently applied. The simple three-cornered triangle is the basic principle of triangulation. Triangles are divided into three parts, the "base," the "altitude" or "vertical height," and the "hypotenuse" or "slant" line.

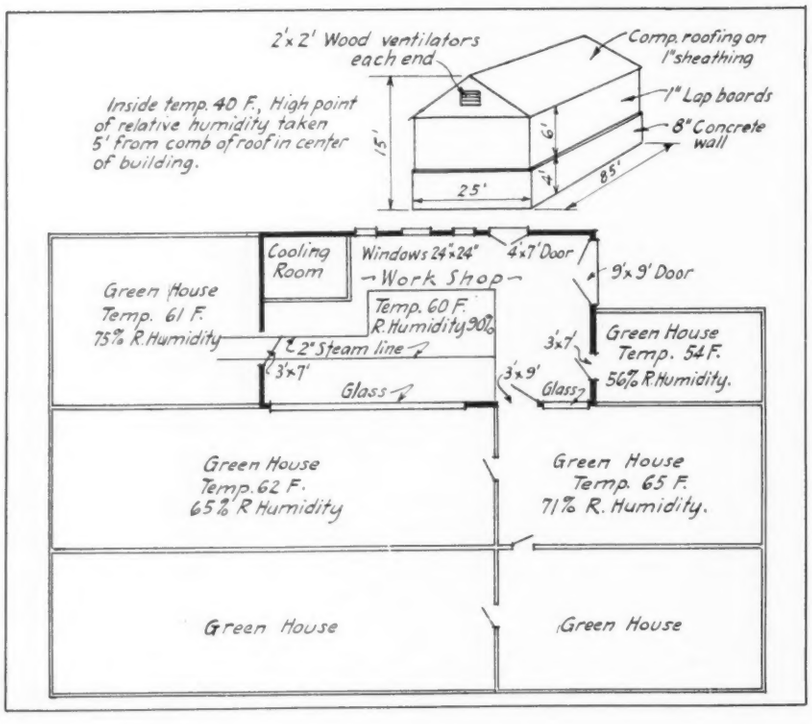
The pictorial drawing of the pitched hood is not a true working drawing, but merely a scenographic drawing to show how triangles are arranged to develop the surfaces. Imagination is one of principle factors in developing surfaces by triangulation. The craftsman must be able to see in his mind's eye the articles he wishes to develop; divided into triangles. To understand these

(*Continued on page 56*)



THE PROBLEM CORNER

Green House Condensation



American Artisan:

We have a problem which we would like to have you solve for us.

The building is 25 ft. by 85 ft.; 15 ft. is the height from the earth floor to the comb of the roof; sides of building are of concrete 8 inches thick and 4 feet high and 6 feet of 1-inch wood boards; the roof is 1-inch sheathing boards with composition roof; glass surface is 467 square feet; 3 sides of this wood building adjoin glass green houses; there are about 150 feet of 2-inch steam lines in building; the average temperature is 60 degrees with a range of humidity from 70 to 90 per cent. The average temperature in the three green houses is 62 degrees with a range in relative humidity from 56 to 71 per cent.

Enclosed find a rough sketch of the green house. This building is only used for a work shop, i. e., they plant their seeds and bulbs in small boxes and then take them into the surrounding greenhouses to grow. The cooling room is no more or less than a storage room for plants to be delivered. I might say that the doors entering into this work shop are not tight fitting doors.

Since there is such a high relative humidity the water is always hanging and dripping from the sheathing boards and as they are always wet, it is destroying the sheating boards. A carpenter recently installed two wood louvre type ventilators at each end of the building which haven't proved successful.

I think it is a case of giving this building more dry heat, erecting double doors entering from the green houses and a more practical ventilator.

Will roof ventilators, or additional steam lines or a warm air furnace solve this problem? We would appreciate your recommendations.

E. K., Penna.

Reply By
Howard A. Middleton, Sedalia, Mo.

I assume that it is desired to stop condensation on the wood surfaces. This condensation results from a 54° dew point (60°/80% air) and low wall temperatures. There are two ways to stop the condensation; (1) lower the dew point or (2) raise the wall temperatures.

(1) It will be difficult to lower the dew point. The air that enters the work shop is evidently largely from the green house rooms through door usage. Heating this air will not change its dew point. Positive introduction of large quantities of outdoor air will lower the dew point but will greatly increase the heating load, if 60° is to be maintained. The correct amount of outdoor air and additional heat can only be determined after door usage is determined. This method of correction would be more expensive to install and operate than;

(2) Raising the wall temperature. A study of the present wood walls shows that the inside surface film resistance is 30% of the total wall resistance. Consequently with 60° inside and 54° dew point, condensation will occur at an outdoor temperatures of 40° or below. Now this moisture will hang on the walls at higher outdoor temperature due to the high relative humidity in the room and you may feel that the walls are condensing moisture even at 60° or 70° outdoors. By applying a nominal 4" of rockwool to these walls the inside surface film resistance becomes 3.95% of the total wall resistance and condensation will not begin until the difference between indoor and outdoor temperatures is $100 \times \frac{60}{3.95\%} = 154°$. So with the rockwool insulation a theoretical outdoor temperature of 96° below zero would need to be reached before condensation would occur.

Method No. 2 is a positive correction whereas the large number of variables involved in method No. 1 make it doubtful what results to expect. The uninsulated walls would sweat in zero weather with a dewpoint of 42° or a relative humidity as low as 50%.

I will be glad to know how this problem is finally solved.

Insulating Value of Pipe Coverings

American Artisan:

Could you give us information in regard to proper covering for warm air pipes?

Our customer contends that someone has advised him that it is not necessary or desirable to use asbestos covering on the hot air pipes running from the furnace to the hot air registers, as the asbestos covering has a tendency to absorb heat instead of saving heat.

He contends that the best method is to paint these pipes with aluminum paint.

We would like to have your opinion on this matter, and we are enclosing self-addressed, stamped envelope and will thank you for your prompt answer.

J. F., Georgia.

Reply By
The Editors

In reply to your letter regarding covering your warm air leader pipes, the information generally used was established at the Research Residence, University of Illinois, Urbana, Illinois, several years ago. Quoting from Bulletin No. 120:

1. The use of thin sheets of asbestos paper on bright tin leader pipes results in a waste of heat.
2. Uncovered bright tin pipes are more efficient carriers of heated air than asbestos paper covered bright tin pipes.
3. This fact is true regardless of the degree of brightness of the tin surface.
4. No small number of applications of asbestos paper will suffice as an insulator. Several thicknesses are necessary to make a covering equal in this respect to the bare tin.
5. Accumulation of dust and dirt on the pipes does not alter greatly the amount of the loss.
6. The heat loss from warm air furnace pipes covered with one layer of asbestos paper is an important item in the cost of heating, amounting generally to more than five per cent of the coal consumption, depending upon the number and size of the pipes used.

"The heat loss from bright tin leaders is 62 per cent greater with one thickness of paper covering the bright tin pipe than when the same pipe is left uncovered.

"Eight thicknesses of 12-pound asbestos paper are required to effect the same insulating value as uncovered bright tin pipe."

Quoting from Bulletin No. 141, we find that insulating leader pipes by the use of three-ply corrugated asbestos paper does result in an increase in heat available at the registers when the combustion rate exceeds seven pounds of coal per square foot of grate area per hour. There is no saving in heat loss at combustion rates under seven pounds.

Many claims have been made for the insulating value of metallic paint (including aluminum). These metallic paints get their insulating value from the fact that the paint pigment generally is composed of flat flakes of metal which form a mirror-like surface and reflect heat back into the pipe on which the paint is applied. If the surface is not bright there is no insulating effect. So far as we know, no authentic tests have been run to determine the exact insulating value of this paint but we suggest that you write the Aluminum Company of America, Pittsburgh, Pennsylvania and the University of Illinois, Urbana, Illinois.

You may obtain Bulletin No. 141 for a cost of 85c and Bulletin No. 120 for 75c by writing the Engineering Experiment Station, University of Illinois, Urbana, Illinois. These bulletins contain some very interesting graphs on which the data quoted has been presented.

Controlling Oil Fired Furnaces

American Artisan:

I would appreciate it if you would forward me some information in regard to baffling furnaces, especially cast iron furnaces where coal will be used for fuel.

We have installed a great many forced air jobs using oil for fuel and then we would always baffle our furnaces and stop our blower when the room thermostat is satisfied. This has always worked out very satisfactorily but now we have installed a few in cast iron furnaces with coal as fuel and have not had quite such good results. We baffled these furnaces just as we did with oil, had a room thermostate, fan control and limit control, but could not keep the house from overheating or otherwise getting too cold.

I thought the reason was this: with the room thermostat located on an inside wall it took too long for the fire to start up and raise the temperature in the room because the cold air entering through windows and outside wall would drop and then follow across to room thermostat and the floors would be very cold.

I was wondering if it would not be more satisfactory if furnace was not baffled and we ran the fan at a very low speed. Understand I am only referring to cast iron furnaces.

G. W. R., Michigan.

Reply By
The Editors

We do not believe that the trouble you mention is due to baffling inasmuch as baffling a furnace casing is a function of fan operation and has little to do with the type of fuel used.

Furnaces are baffled when a fan is applied because the fan blows the air by the castings at a much faster speed than the air flows by under gravity operation. Hence, if we do not baffle the casing we will usually find the air next to the casing going through the casing so fast that it does not pick up any heat. By baffling the casing we restrict the space through which the air flows and, hence, compel all air to pick up heat.

Your problem seems to be one of control. With oil, when your thermostat demands heat the oil burner starts, the temperature pick-up is rapid and under your system of control as soon as temperature is up the fan starts to run; when the room thermostat is satisfied it shuts off the oil burner and because the fan continues to run the furnace very quickly becomes cold. The fan runs until bonnet temperature drops, when the fan stops.

With coal fire, your heat pick-up (when the thermostat calls for heat and opens the draft door) is much slower. However, because you have a large amount of fuel you produce a great deal of heat, particularly during long heating-up periods and, unlike oil, this mass of fuel cannot cool off instantaneously as does your oil burner. Therefore, when your room thermostat is satisfied and closes the draft you still have a great deal of heat being generated and this continues for a considerable period of time. Because your fan operates off bonnet temperature the fan continues to run until the fire dies down and practically all of this operation tends to over-run the room thermostat.

There are two things you can do—one is to place a limit control in the bonnet or, better yet, a stack switch in the smoke stack and wire this instrument into the thermostat—damper motor circuit. The instrument should be set just as low as possible to permit you to generate as much heat as you need, but it will close the draft door before the room thermostat is satisfied if it is set correctly. This means that when your room thermostat is satisfied your fire is already dying down so you eliminate much of the room temperature over-run.

The second thing you can do is to control your fan by the room thermostat and when the thermostat is satisfied close the draft and stop the fan at the same time. There is some danger of burning out your furnace under this operation but by having the limit control set low enough you will reduce this danger and secure satisfactory results.

The National Warm Air Mid-Year Meeting

DESPITE the fact that the program of the mid-year meeting of the National Warm Air Heating and Air Conditioning Association held June 4, 5, and 6, in Columbus, Ohio, was disrupted somewhat because of the Supreme Court's ruling on NRA, the excellent program featuring cooling and air conditioning proved of value and interest to the manufacturers, jobbers, salesmen and dealers who attended the convention.

Of chief interest to contractors are two business actions. First, the manufacturers decided to voluntarily operate under the rulings of their former code. This includes manufacturers of furnaces, fittings, registers and accessories. Second, the practically unanimous agreement of all manufacturers present was to uphold the present price standards.

Of further interest was the report of the Research Advisory Committee that due to some difficulty with the plan to conduct tests on cooling by dehumidification the Research Residence would not be used this summer unless the association contributed sufficient funds to conduct tests on cooling by the use of water. Contributions gained from the floor provided sufficient money to start the program and, in accordance with the recommendation of the Research Advisory Committee, tests during the coming summer will be conducted on cooling with water.

Air Conditioning

The convention was opened by President H. T. Richardson who presented a brief resume of the reaction of manufacturers to the Supreme Court's ruling on NRA. President Richardson pointed out that due to the court's ruling, it is no longer compulsory for manufacturers to abide by code regulations, but he told the convention that manufacturers had agreed voluntarily to abide by the previous code rulings and, furthermore, that prices would probably be maintained by most of the manufacturers.

The first paper was by Edwin A. Jones, Milwaukee, entitled "Fundamentals in Air Conditioning." Mr. Jones emphasized that manufacturers and contractors to really make progress in air conditioning must understand the basic fundamentals of heating and air conditioning. He recommended the establishment of pounds of air rather than C.F.M. as the basis for heating calculations. "No corrections for temperature would then have to be made, thus eliminating the variables now found in our calculations. Manufacturers should make a determined effort to get young men, preferably college graduates, into their engineering and sales staffs. Such additions would bring in new ideas and make it possible for the manufacturers to give closer co-operation through their engineering and sales staffs." Mr. Jones declared that, in his opinion, control of humidity, also control of dehumidification in cooling, were two problems calling for a great deal of study. "Additional study must be given the matter of air movement in rooms, particularly room temperature gradients, stratification, cold glass areas, velocities in ducts and at registers, the operating characteristics for all types of fans used in domestic heating and cooling."

Highlights

Business:

Furnace and accessory manufacturers agree to continue under their codes on a voluntary basis.

Association subscribes sufficient money to inaugurate a research program on cooling with water. Begins this summer in the Research Residence.

Present prices of furnaces and accessories to be maintained by agreement of many manufacturers.

Association reports increased business in first half of 1935. Also much larger volume in 1934 over 1933.

Association book on gravity heating, edited by Professor J. D. Hoffman, being set in type and will be ready for distribution in about 30 days.

Technical:

"Manufacturers and dealers must understand the fundamentals of heating if we are to hold present and future air conditioning work."—E. A. Jones.

"Most gravity problems have been solved, but rule-of-thumb methods in forced air heating lead only to trouble. Many problems remain to be solved."—T. W. Torr.

"Manufacturers bear the brunt of trouble expense. Equipment must be matched and 'bugs' eliminated. Simpler formulas are needed for forced air work."—J. W. Norris.

"Dan't blame the dealer—the manufacturer is to blame for most of our troubles because he is so greedy."—An objecting contractor.

"The engineer must be the interpreter of the information now available."—C. S. Stout.

"Casting temperatures in hard fuel firing seldom exceed 1100 degrees."—A. P. Kratz.

"Temperature loss in ducts can be compensated for by figuring a loss of six tenths of a degree per running foot. Oil burning furnaces and combinations cannot be rated without a specification covering amount of oil burned. The control systems which prove satisfactory on hard fuel are also suitable for oil burning."—S. Konzo.

Conditioned Air

T. W. Torr, Dowagiac, Michigan, addressed the convention on the subject "Conditioned Air—its Installation, Equipment and Problems." Mr. Torr asserted that, in his opinion, most of the problems connected with gravity heating had been solved. He said, however, that too many contractors are installing by rule-of-thumb methods and that a determined effort should be made to have all gravity heating systems designed according to the Standard Code. The speaker said that with the advent of forced air heating and semi-air conditioning entirely new problems have been presented to the industry and entirely new standards of comfort have been established by home owners.

"Contractors and engineers must understand thoroughly the inter-relationship of temperature, cubic feet of air per minute, register location, velocity, heat loss and heat gain in summer. Slighting any one of these factors usually results in unsatisfactory jobs." The speaker offered the suggestion that in designing systems all first floor branches should be designed to the same friction and a second but also identical friction for all second floor branches should be used. "Present problems which must be solved are—too many, too few or too poorly located returns, short branch air flow as compared with long branches, resistances throughout the system, efficiency of the equipment used and, while many of the facts relating to each of these problems individually have been solved, much additional work must be done to solve these difficulties as they relate to one another."

Mr. Torr said that humidification is becoming an increasingly important problem. "Home owners are demanding more humidification and a better control of humidity. Controls are also highly important and must be tailored to the job and to the apparatus used. Cooling at the present time is being done by three general methods as follows: 1—attic ventilation wherein a minimum of twelve air changes per hour must be used; 2—ice or cold water; 3—refrigeration." Mr. Torr said that the independent contractor must be educated, guided and assisted else cooling and domestic air conditioning will go to large manufacturers who sell on reputation of products rather than upon reputation of design and installation.

Standard Code ABC's

A very interesting paper, entitled "The A B C's of the Standard Code," was delivered by H. F. Randolph of Utica, New York. Mr. Randolph stated that he believes one reason for contractors' hesitancy in using the Standard Code in gravity work is because most contractors do not understand and appreciate the basic fundamentals upon which the Standard Code is based. Mr. Randolph explained that the Standard Code is based upon a quantity of 1,000 Btu's per hour. "For example: dividing the glass area by twelve means that twelve square feet of glass area will lose 1,000 Btu per hour, and the factor 60 for a standard frame wall means that 60 square feet of wall will lose 1,000 Btu per hour; both at 70 degrees temperature differential. The factor 9 for the first floor and 6 for the second floor means that nine square inches of warm air leader pipe will deliver 1,000 Btu's to first floor registers and six square inches of leader pipe will deliver 1,000 Btu's to second floor registers." Some of the problems of gravity heating were cited as—use of under-sized furnaces and under-sized warm air leader pipes, as a result of which we deliver higher register temperatures than anticipated and a lower volume of air. This may result in shorter furnace life, more frequent firing periods, higher ceiling and lower floor temperatures.

Speaking on the subject "Trouble Jobs, the Responsibility of the Manufacturer, Jobber and Dealer Therewith," John W. Norris, Marshalltown, Iowa, stated that responsibility for trouble should lie with the dealer but seldom does. "The dealer ought to be able to take care of all of his trouble jobs, but the usual procedure is for the dealer to call in the manufacturer when trouble develops. Jobbers should know more about design, installation and trouble shooting but as it is at present most jobbers are merely distributors and are of no help in case of trouble.

Trouble Jobs

"Manufacturers should do experimental work so equipment will be correct in every detail. Among such problems are the correct sizing of casings, the use of proper baffles and the elimination of variations in bonnet temperatures. Manufacturers doing mechanical heating should be sure that the blower is of the correct design and size for the furnace with which it is to be used. Blower, furnace and controls, should be matched. Controls are highly important and simplicity of control layout and electrical connection is to be desired. One thing which all manufacturers can do at practically no expense is to see that instructions for setting, designing and installing apparatus are plainly explained to the contractor and, wherever possible, illustrated with detailed sketches and drawings."

Poor Dealers

Mr. Norris made the interesting assertion that there are a large number of dealers who should not be engaged in air conditioning or mechanical heating. These contractors cannot and will not study the data available. The speaker suggested that one forced air heating or air conditioning dealer in any given community for any one manufacturer should be sufficient and that, perhaps, the industry will come to the situation where a manufacturer establishes one dealer in forced air or air conditioning and another dealer in gravity heating work. Mr. Norris explained how his company is endeavoring to work out a system wherein the total cubage of the house will determine the size of apparatus and amount of air required. From this total amount of air, the dealer may arbitrarily establish pipe sizes for various rooms according to his judgment and according to rules which will not necessitate figuring individual calculations for each room in the house.

A Contractor Objects

At this juncture a contractor asked for permission to speak and said that, in reply to Mr. Norris, he personally felt that the manufacturers are principally to blame for many of the conditions described. "Many manufacturers are so greedy for business that they will appoint any Tom, Dick or Harry as a dealer in a community where they feel they must have a dealer outlet. No manufacturer should design an installation for a job very far removed from the home office because no engineer can appreciate the problems which arise in actual installation. Every dealer should be able to design his own installation. Many jobbers are in the same category as the manufacturers in that they are simply order takers looking for volume and offering little, if anything, to the contractor." The speaker decried the use of pre-fabricated ducts as he said , in his opinion, every job should be tailor-made and the use of pre-fabricated ducts usually resulted in slip-shod calculations. "Much of our so-called air conditioning apparatus is nothing more than dolled-up gravity heating apparatus. If a manufacturer actually makes air conditioning and forced air heating apparatus he should be entitled to more consideration than the manufacturer who simply calls dressed-up equipment, air conditioning and mechanical heating apparatus."

Committee Reports

Ralph Blanchard, chairman of the New Membership Committee, recommended that the Dail Steel Products Company, Enterprise Boiler and Tank Works, Chicago, Illinois and the Keith Furnace Company of Des Moines, Iowa, be admitted to membership. Pearl Miller, of the pipe and fitting committee, reported a new price list for fittings will be placed in the mail very shortly. J. H. Van Alsburg, chairman of the Technical Educational Committee, reported

that this year's short course at Michigan State College had the largest attendance to date with unanimous commendation. Those attending requested an additional day at the next course devoted to calculations and design of cooling apparatus and systems. Speakers from the Speakers' Bureau were included on several state association programs during the past winter and have addressed numerous associations and gatherings during the winter and spring.

Better Selling

Jan. S. Irvine, Toledo, Ohio, speaking on the subject, "This Warm Air Furnace and Air Conditioning Business," said that, in his opinion, NRA was not a total flop nor could any effort be called a flop which has thousands of adherents. If NRA has done nothing else it has set up and strengthened associations. He pleaded with manufacturers and dealers to salvage all the good things gained by code compliance and believes that Congress will pass some sort of legislation to permit voluntary co-operation.

"The thing everyone is interested in is profit—not the manufacture of castings, accessories or any particular item. The furnace industry stands the best chance of going ahead in the near future and I believe warm air heating is by far the best type of heating now available to the public."

Mr. Irvine cited figures from the Real Property Inventory, which show that 6,000,000 or approximately 39 per cent of all types of heating systems are warm air furnaces, while steam accounts for 8 per cent and hot water and vapor for 6 per cent. Some 42 per cent of all residences in the country are still heated by stoves or have no heat at all.

"These figures," declared the speaker, "indicate that the warm air furnace industry has had a lion's share of all central heating system installations. One trouble has been that people bought "hot air" furnaces because they were the cheapest heating plant available. The industry can get higher prices for its equipment, particularly forced or mechanical heating, but higher priced apparatus and higher priced installations must be sold. People do not come in to buy higher priced goods."

"The warm air industry has much to sell. The number of sales will be directly proportionate to the number of calls made. There are a number of things which the industry should do. We need better humidifying apparatus and humidification control. We should not be interested in readings of instruments, but interested in the comfort of the home owner. The gravity furnace will never be entirely eliminated; there is nothing radically wrong with a good gravity heating plant excepting that we need to add some means for cleaning, some better means of humidification and some form of automatic control. Heat conservation, as indicated by the need for insulation, awnings, storm sash, and for similar materials in summer cooling are widely needed."

Engineering

"Engineering—Benefit or Bunk," was presented by C. S. Stout, Marshall, Michigan. The speaker stated that he, himself, was a practical engineer; had been identified with the warm air heating business for a long period of time; but he could not help but feel that much simplification in design procedure is a prime need of the industry. Old rule-of-thumb methods are not to be recommended and at the same time a considerable amount of simplication must be made in the nomenclature, formulas and rules. The speaker pointed out that the public is demanding more comfort. Women wear fewer clothes, they demand closer control of temperatures, they are not satisfied with drafts, or cold corners.

"Research and engineering must do two things—first, investigate and second, interpret. The engineering staff or the public relations council are the logical interpreters to explain in understandable language the findings of research and engineers to the contractor and the public."

"The Control of Fans and Blowers in Warm Air Heating Plants," was presented by G. H. Luscomb, who pointed out that a control system is a piece of apparatus which can either make or break a satisfactory heating installation. A poor installation can be made satisfactory with good control whereas the best heating system in the world can be unsatisfactory if the control system is not intelligently designed and correctly installed.

Controls

"At the present time," the speaker pointed out, "there are several general types of control schemes in use by the industry. One of the earliest and also one of the simplest control systems has a thermostat which controls the fire. The fan runs continuously. A limit control prevents the fan from blowing cold air and starts the fan should bonnet temperatures get too high. A second system employs a two-speed fan with the fan operating most of the time on low speed and running on high speed only when bonnet temperatures reach a high speed setting. The chief difficulty with this system is the problem of balancing air delivery. The thermostat in this system controls the fire. Another type of control system employs a fan having several selective speeds. The thermostat controls the fire and the fan is speeded up progressively as bonnet temperatures rise. In still another system the fan is operated by the room thermostat, while a fire control placed in the bonnet or in the stack takes care of combustion. In this system heat is maintained at all times in the furnace bonnet. Under a fifth system the room thermostat starts and stops the fan and at the same time opens and closes the furnace draft damper, or starts and stops the automatic firing device. A limit control keeps the fan from starting until bonnet temperatures reach a pre-selected temperature."

The speaker advocated forgetting the usual dial settings on bonnet or stack control instruments. The guiding factor should be register air temperature and whatever temperature should be the setting of the bonnet instrument rather than setting the instrument by the calibrations on the dial.

On Thursday morning the Gravity Heating Book Committee reported that books would probably be ready for mailing in approximately thirty days.

F. G. Sedgwick, chairman of the Research Advisory Committee, reported as outlined previously, that

(*Continued on page 72*)

nereas the
he world
ne control
designed

he speak-
e several
chemes in
ne of the
e simplest
hermostat
The fan
it control
wing cold
ould bon-
high. A
wo-speed
most of
l running
n bonnet
gh speed
ulty with
n of bal-
thermos-
the fire.
stem em-
selective
ntrols the
l up pro-
peratures
n the fan
ermostat,
d in the
kes care
tem heat
s in the
ifth sys-
tarts and
me time
ce draft
s the au-
mit con-
starting
reach a

orgetting
bonnet
ts. The
register
ver tem-
tting of
her than
the cal-

e Grav-
ttee re-
robably
approxi-

n of the
ttee, re-
sly, that
2)

Air Conditioning Section

Devoted to the technical and merchandising problems of air conditioning in homes and small buildings

NO MAN knows, today, what will be the future of air conditioning. Nor do we know who will install air conditioning systems. To make the proposition more interesting, few of us can picture clearly the air conditioning installations of the future.

- - - If we are inclined to sit back in satisfaction—beware; for this market has only been scratched and there are those who eye its possibilities with envious and greedy eyes.

- - - Don't get the idea that you know all about air conditioning. Apparatus and ideas are changing so rapidly it is difficult to keep abreast of the progress. What is in the future today may be used and forgotten tomorrow.

- - - What are air conditioning leaders thinking about today? Any number of things. If you want to get some insight into the picture look over the variety of subjects presented in this month's section. And that's only one small portion. He who would air condition must be ready to pay the premium.

HERE'S THE BURNER THAT MAKES Everybody a PROSPECT

the SCOTT S-N NEWCOMB "JR-2" OIL BURNER

REVOLUTIONARY!

Economical to operate.
Burns cheap low-grade oil

Trouble-free, does not clog.
Nozzle orifice 110 times the area of pressure burner nozzles

Easy to install—tailor-made flame to fit boiler flame travel.
Adjustable from ½ to 3½ gal. per hour

Low first cost and no extra pump to buy.
ONE pump—dual purpose—meters and lifts oil. 1000 fuel rate adjustment

Positive acting safety—not subject to corrosive flue gases.
Safety mounted with burner—not in stack

INEXPENSIVE TO SERVICE. Like a modern automobile, the S-N "Jr-2" is adjustable to normal wear. Hence, no heavy investment in parts and consequent heavy loss through obsolescence.

Magnetic cut-off valve—electric ignition—blower which gives violent swirl to air—large area filter—quiet operation. Many other exclusive S-N features.

BUNGALOWS, cottages, small homes of all kinds—stores, shops—all are now salable prospects with the S-N "Jr-2." Handles up to 10- and 12-room homes.

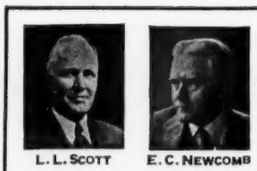
Scott-Newcomb low prices and recognized quality create these prospects for you.

Scott-Newcomb exclusive features and demonstrated superiorities turn them into customers.

In spite of their low price, these burners are not to be confused with burners "stripped down" to sell at a price. They are strictly S-N design and construction throughout, from the watch-like precision of the operating parts to the baked-enamel finish.

Some territories are still open to alert dealers who want to build up a permanent business.

Send today for full details of the line that has everything—the franchise that leaves no open gaps for your competitors.

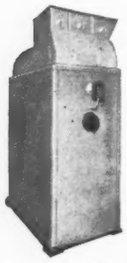


L. L. SCOTT E. C. NEWCOMB

L. L. Scott and E. C. Newcomb are recognized throughout the world as the pioneers and leading engineers in the industry. Practically all the important features of automatic heating equipment were invented by them. Their outstanding skill and longest experience are back of every S-N Product.

SCOTT-NEWCOMB, INC.
1922-I PINE STREET, ST. LOUIS, U. S. A.

The S-N line is COMPLETE



S-N Air Conditioner

A complete central unit for year 'round efficiency—the result of years of automatic heating engineering, development and manufacturing experience. Heats in winter, conditions the air the year 'round. Can be equipped with special cooling coils served by a refrigerating unit in summer. Oil or gas burner optional.

S-N Oil Furnace

For steam, hot water or vapor heating systems. Optional burners for low-grade oils or gas. 90% efficiency! Three sizes—600, 1,000, 1,500 ft. steam E. D. R.

S-N "Pioneer" Pressure Type Burner

Engineering superiority, beauty of design and finish, exclusive mechanical features, quietness and super-efficiency. Three models, from 250 to 10,000 feet steam radiation.

New S-N Gas Burner

Can be furnished with all S-N heating units. This is a unit-constructed UP-SHOT BURNER — efficient, flexible. Combustion is complete and noiseless. Designed to work over a wide range of gas pressures.

Modernization, Featuring Air Conditioning, Has Made This 45-Year Old Building New

THE ramifications of air conditioning in the general field of remodeling, which today constitutes the industry's largest potential sales market, opens to the contractor opportunities to bid on jobs of all sizes. In some instances, particularly the smaller jobs, the contractor may take a contract for the entire installation, including equipment. In other cases the apparatus is specified by a manufacturer or engineering firm doing the entire job under their own supervision; subletting such work as can be best handled by local contractors.

An interesting example of the latter class of project is the recently installed air conditioning system in the remodeled Insurance building in Omaha, Nebraska, in which practically the entire interior of the building was rehabilitated to accord with the most modern standards. The building is about 45 years old, is eight stories high and has a total of about 100,000 square feet of floor space.

The rehabilitation program was instituted after the purchase of the property by the Woodmen of the World Life Insurance Association which occupies about 45 per cent of the floor space and also plans to move its radio broadcasting station into the building.

Design of the System

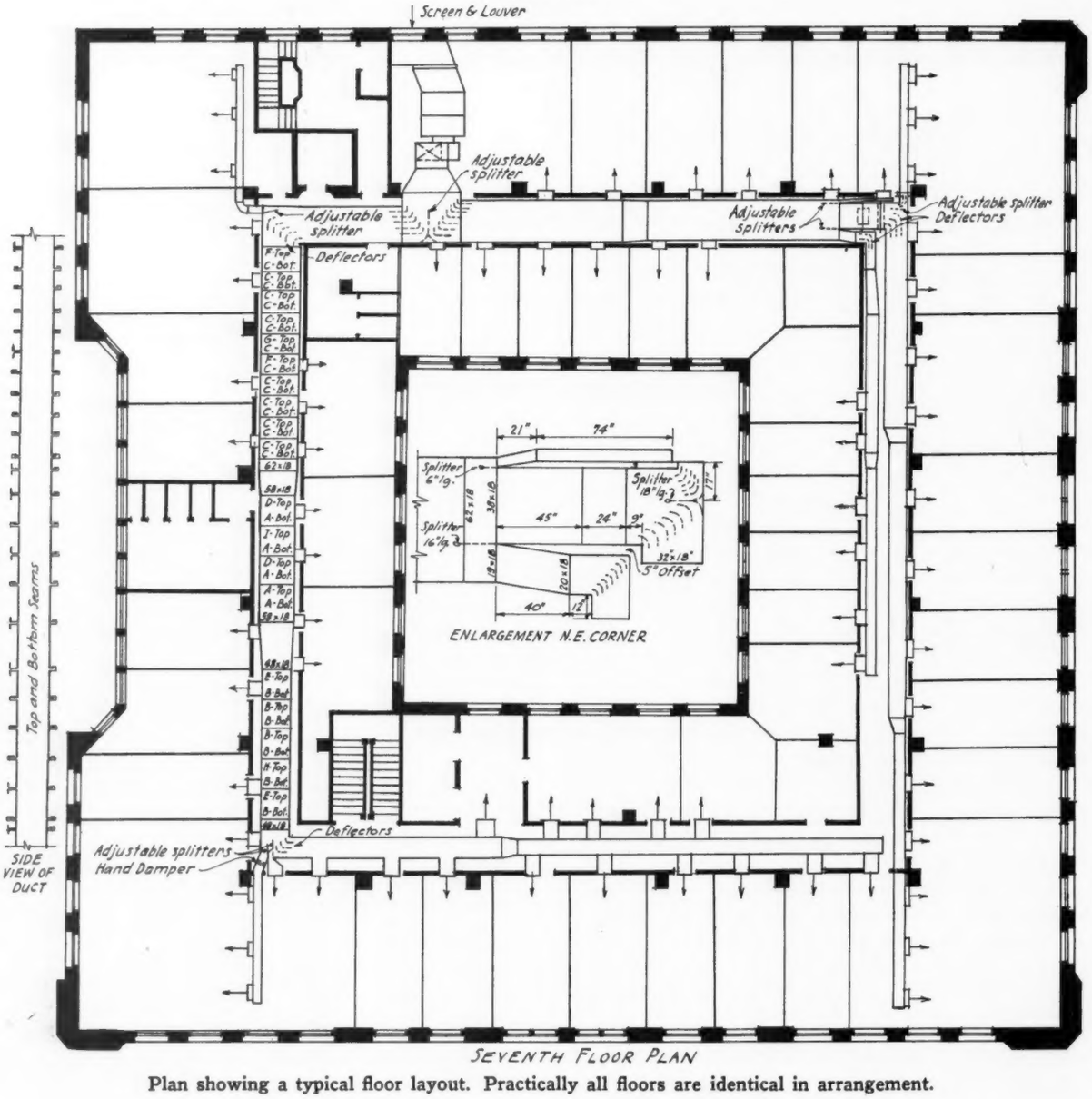
The air conditioning system is of the central type designed to heat, filter and humidify the air in winter and cool, de-humidify and clean the air in summer. Positive circulation is maintained all year. The major part of the heating load in winter will be maintained by direct radiation. The apparatus consists of a Carrier centrifugal refrigeration machine which cools water for the individual Carrier conditioning units located on each floor. Each floor unit is complete in itself and contains an outside air intake, filters, de-humidifier, cooling coils, blower and pump. The cold water needed is withdrawn from the central system and returned to a basement collecting tank and refrigeration machine for re-cooling after passing through the air cooling coils.

The sheet metal contractor, Bjornson and Wessel Co., Inc., Omaha, were faced with the problem of getting into the halls a large amount of ductwork in such a way that the installing could proceed without interfering with the elaborate remodeling work undertaken. The plan called for the conditioning apparatus to be placed in one corner with large main ducts leading down the corridors and opening into the offices along

The old building as it appears from the outside. Note the sign advertising the remodeling and featuring the complete air conditioning of the entire interior. The picture was taken a few weeks ago.

A typical old corridor showing the old partitions, walls, transoms, and the new duct hung, but not concealed. The branches have not been cut in. The article describes the fabrication and erection of these corridor ducts. The old head room was 11 feet.

A finished new corridor showing the duct plastered in, with a new ceiling, new corridor walls and new woodwork. The head room of the new corridor is 9 feet. Branches serving offices are also above the new ceiling.



Plan showing a typical floor layout. Practically all floors are identical in arrangement.

both sides by means of short branches and grilles located in corridor partitions. The old corridors had a minimum of 11 feet of head room, which was taken advantage of by using two feet for the corridor ducts and a new false ceiling leaving 9 feet of head room in the finished corridor. Air is withdrawn from the offices through grilles in the corridor doors, thence travels down the corridor and back to the blowers.

For summer cooling approximately 300 tons of refrigeration capacity will be developed by the apparatus. Some 1,100 gallons of cold water per minute will be circulated from the central plant to the individual floor coils. Note should be made of the fact that this amount of refrigeration is not typical of a building of this size. It happens that the building is protected on two sides and shady on a third, which reduces the cooling load. Also no zoning of the building vertically or horizontally was planned for, as it was not thought necessary by the engineers.

The photographs show some of the interesting "before" and "after" views of the installation. The drawings show the more important details of fabrication and erection, together with a typical floor plan showing the work as laid out.

The problems of fabrication and erection are well described by the contractors. They say—

"We took a portable drafting board to the job and laid out all shop drawings and details from Carrier's drawings. These drawings were blue printed and taken to the shop for fabrication. We also sent to the building a 6-foot brake and a work bench to use in making panels and fittings additional to those made in the shop. A few smaller tools we sent such as button punches, lever punches, electric drills and a vise. We used three scaffold jacks which had six planks on top. This formed a scaffold approximately 20 feet long.

"We started first by erecting the large 'tee' fitting at the apparatus room and worked each way around the corridor. We used as hangers galvanized band iron which was fastened to bolts put in by the contractor from the floor above. The old floor tile was not safe

enough to fasten hangers and for that reason we could not use toggle bolts.

"All large and small fittings, such as square elbows, transitions, and fan connections were made and assembled in our shop. All square elbows were made of standing seam construction except those 24 inches or less in width. Vanes or turning blades were put in all elbows at 5-inch centers on duct over 24 inches in width and 3-inch centers on duct 24 inches or less. All ducts over 24 inches in width were of standing seam construction. The standing seams were 1-inch and 1½ inches according to the size of the duct. This duct was not assembled in the shop, but was made of different length panels which were also determined by the width of the duct. The wider the duct, the shorter we made the panels. The duct under 24 inches was made in 10-foot lengths using seam construction and drive slip connections at each end. This duct was small and could be joined together and erected in approximately 30-foot lengths.

Duct Erection

"The ducts were put together on an adjustable rack in approximately 16-foot sections and fastened together with rivets and a button punch. On the end of each section at the top of the duct, the edges were turned to make a drive slip connection. This is the only way we could make a connection and make it tight. Air splits were put in all branch ducts and fittings. The ends of the splitters were stream lined to prevent a whistle from the air passing over them. These were fastened in the fittings with bolts which have slots in the head. The slots are used for adjusting the splitter by a special screw driver. When the ducts were all in and finished, the contractor constructed an arch ceiling underneath which completely hides the ducts from view. The grilles were put on after the walls were all plastered.

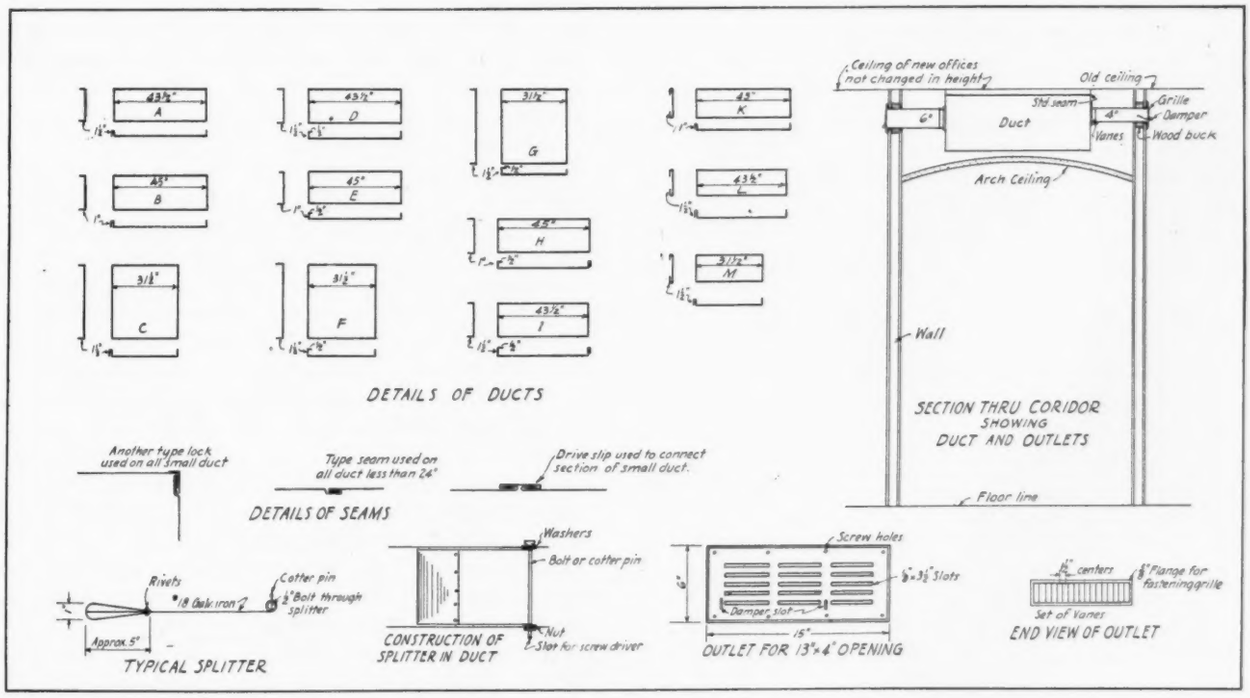
"After a duct was hung, we cut in the outlets which were to be located opposite each window as shown on the plan. We next put in 2-inch stubs to which we could fasten the remainder of the outlet after the contractor had set the wood bucks in the tile wall. Inside the openings we put a set of vanes to straighten the air as it came from the duct. These outlets varied in size according to their location in the building. Felt strips were glued around the outlets to prevent leakage of air and dirt.

Sound and Vibration Insulation

"It was in our contract to set the separate units on each floor. These were set on wood and cork bases and fastened with lag screws. We were also to make and erect the casing connecting the unit to a window through which fresh air is taken. In the window we installed a louvre with a diamond mesh screen on the outside. On the inside we fastened maximum and minimum outside air dampers. Inside the casing we installed a filter frame to hold 20 by 20-inch filter cells. The casing was made of 18-gauge, galvanized iron, with standing seam construction. In the top of the casing we installed a return air damper. On the side of the casing we put a door which made it accessible to the inside.

"In order to get return air back to the unit, grilles were built in the bottom of all corridor doors by the contractor who supplied them. The return air passes down the corridor to a return air grille in the wall of the apparatus room. Behind this grille we installed in a metal frame sheets of Celotex on 1-inch centers.

(*Continued on page 50*)



Details of the duct sections, splitters and corridor construction. The details refer to duct sections shown on the typical floor plan. Note special dampers, outlets and arrangement of corridor mains and branches.

Forced Air Heating Facts From the Research Residence

By S. Konzo

This article, the seventh of the series, and succeeding articles on forced-air heating research carried on at the Warm Air Research Residence in Urbana, Illinois, are based to a large extent on material published in Bulletin 266 of the Engineering Experiment Station of the University of Illinois. The author has also extensively drawn on additional sources for these discussions.

Performance Characteristics of Forced Air Heating Systems

IN THE design of a forced-air heating system a great many assumptions are made, some of which will be found to be in agreement with actual conditions in the plant. More often, however, it will be found that the conditions assumed will deviate considerably from the conditions that actually exist. In this and the succeeding article some of these assumptions will be critically examined and noted. It is only by careful comparison between actual and assumed conditions that the art of designing a forced-air heating plant can be perfected.

I. Intermittent Operation

In designing a forced-air heating system, the calculations for determining the dimensions of the ducts and registers are based on the assumption that the operation of the fan will be continuous, and that heated air will be delivered only when the fan is operating. When this plant, which was designed for continuous fan operation, is so controlled that the operation of the fan is intermittent in mild weather, then the performance of the plant will not be the same as that which was assumed when the system was laid out.

In the tests conducted in the Research Residence installation it was found that the performance of the system with intermittent operation of the fan was seriously complicated by "gravity" action in certain ducts. For instance, during the off-periods of the fan practically no gravity circulation occurred in the ducts to the first floor. Very marked gravity circulation occurred in the ducts to the second and third floors, however, and the amount of circulation was determined by the resistance of the particular ducts.

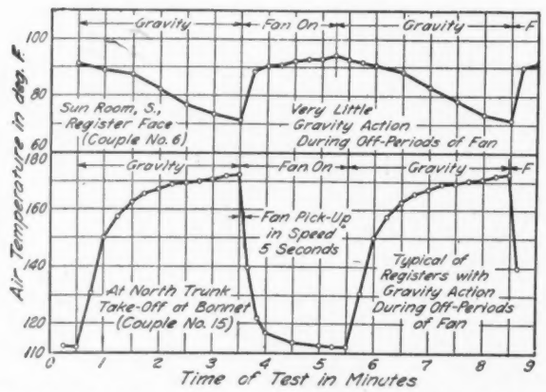


Fig. 1—Typical variations in air temperature with intermittent fan operation in installation No. 11.

The effect of intermittent fan operation in the ducts in which gravity flow occurred, as distinguished from those in which it did not occur is shown in Fig. 1. The case in which gravity flow occurred is illustrated by the lower curve in Fig. 1, from which it is evident that during the off-period of the fan the temperature of the air delivered at the register gradually rose, and when the fan started this temperature was quickly brought down to the normal operating temperature. In the case in which practically no gravity flow occurred, however, as illustrated by the upper curve in Fig. 1, the air in the duct gradually cooled during the off-period of the fan, and was immediately replaced with air at normal operating temperature taken from the bonnet as soon as the fan started.

This gravity action was found to exist in coal-fired plants, where the liberation of heat was practically continuous, and also in oil-fired plants where, although the firing was intermittent, the heat stored in the castings of the furnace was sufficient to promote the gravity action. Furthermore, the action was found to be quite pronounced even in leaders which were over twenty feet in length, but which were attached to stacks leading to registers on the second or third story.

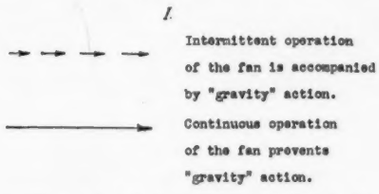
The amount of heat circulated during the off-periods of the fan was sufficiently large so that many of the rooms on the second story were found to be slightly overheated when no dampering was used in the leaders. By dampering the warm air pipes, however, it was possible to obtain a more uniform distribution of heat to the various rooms in the house.

The more serious aspect of the problem is that rooms on the first story were not heated during the off-periods of the burner by the gravity flow and hence tended to cool at a more rapid rate than the rooms on the second story. Fortunately, in most installations the room thermostat is located in a first story room, and hence the first story rooms could be prevented from undercooling.

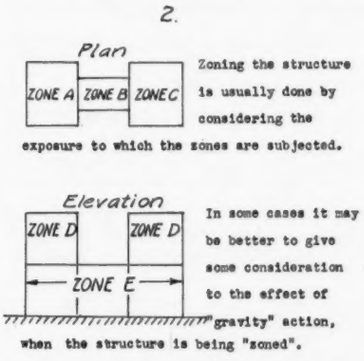
Several possible methods of operation suggest themselves, which might either prevent or overcome the unbalancing effects caused by this gravity action, and these will be itemized as follows:

1) Continuous operation of the fan, either at a single speed or at several different speeds, will distribute the heated air positively to all the rooms regardless of outdoor temperature conditions. (See Fig 2, Part 1.)

Figure 2

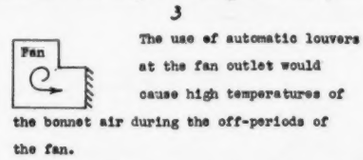


2) Zone controls, in the case of larger installations, will allow the temperature of the first story rooms to be controlled as sensitively as the temperature of rooms which are subjected to gravity action. In this connection, it is the usual practice in "zoning" a building, to include in one zone only those rooms which have similar conditions of exposure, regardless of whether the rooms are on the first or second story. It may



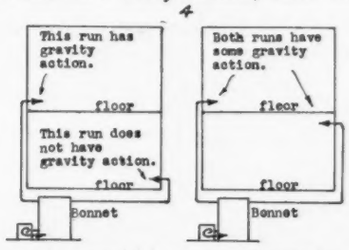
be advisable in studying the possible methods of "zoning" a given structure, to give some consideration to the plan of including in one zone, only those rooms which are subjected to the same gravity action. (See Fig. 2, Part 2.)

3) Automatic louvers, which are placed in the fan outlet and which tend to cut off the air to the furnace when the fan is not operating, have been suggested as a device which will prevent gravity action. Such louvers tend to restrict the air flow and may cause the temperatures in the bonnet to become too high during the off-periods of the



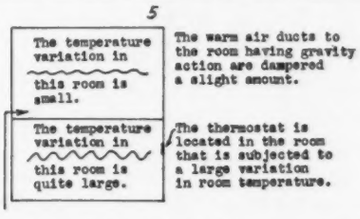
fan. Hence, they are not recommended unless used in conjunction with bonnet thermostats, which operate to turn on the fan when the bonnet temperature becomes excessively high. Even with the latter provision included, the temperatures in the bonnet may become excessive in case of failure of the electric current.

4) Since gravity action can occur in a given duct only when the length of stack is sufficient to produce a chimney action, it is evident that if all the registers were connected with stacks of approximately the same length, it might be possible to have the gravity action take place in all the ducts. Thus if a system were installed so that baseboard registers were used for second story rooms and high sidewall registers were used for first story rooms, then the lengths of



the stacks would be approximately the same and the difference in gravity action between the rooms on the two stories would not be as marked.

5) Due to the more rapid cooling of the room in which no gravity action occurs, as compared with that of the room in which heat is supplied



during the off-period of the fan, the variations in room temperature will also be great. The thermostat should be located in such rooms where the temperature variations are quite large.

II. Velocity of Air in Ducts

After the dampers had been adjusted so that a temperature of 71 deg. F., plus or minus one degree, was obtained at the breathing level in all of the rooms in the Research Residence, a study was made of the velocity of the air in the ducts. The air velocities were measured by means of a Pitot tube used in connection with a very sensitive pressure gage.

A diagrammatic chart of the design velocities and actual velocities obtained at various points in the system, all based on air at 135 deg. F., is shown in Fig. 3. It may be noted that four values are shown at each point where the air measurements were made. The values are stated in units of "feet per minute."

The first number in each group of four represents the velocity determined by *design*, the second number represents the *average* value of the actual velocity measured at the section, the third number represent the *maximum* value measured at the section and the fourth number represenths the *minimum* value measured at the section.

For example, the velocity values for the duct leading to the kitchen were as follows: 463 ft. per minute design velocity, 662 ft. per minute actual average velocity, 775 ft. per minute maximum velocity, and 526 ft. per minute minimum velocity.

From the diagram shown in Fig. 3, it is evident that considerable differences were obtained between the

(*Continued on page 42*)

What Is This Night Air Cooling?

Of all the methods recommended for summer cooling, night air cooling has caught public fancy most rapidly. What can and can't be secured from this inexpensive system is buried beneath a welter of claims and counter claims. The purpose of this article is to separate the truth from the suppositions.

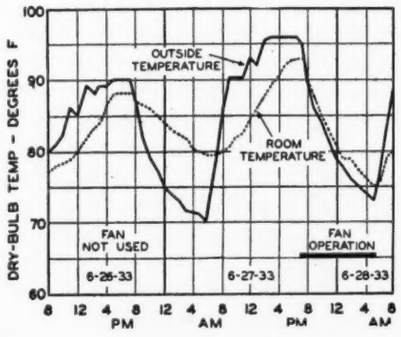
MUCH has been published recently on the subject of attic ventilation or, as the subject should be called more correctly—night air cooling. The purpose of this article is to explain how to design a typical installation.

The theory behind night air cooling is extremely simple. We all know that in most localities the temperature of the air outdoors starts to drop as soon as the sun goes down. "I'm going to sit out on the porch—the house is hot as an oven" is a very old expression yet it sums up in a few words the whole proposition of night air cooling.

Briefly stated the thing we do is to make the temperature inside the house drop along with drop in outdoor temperature.

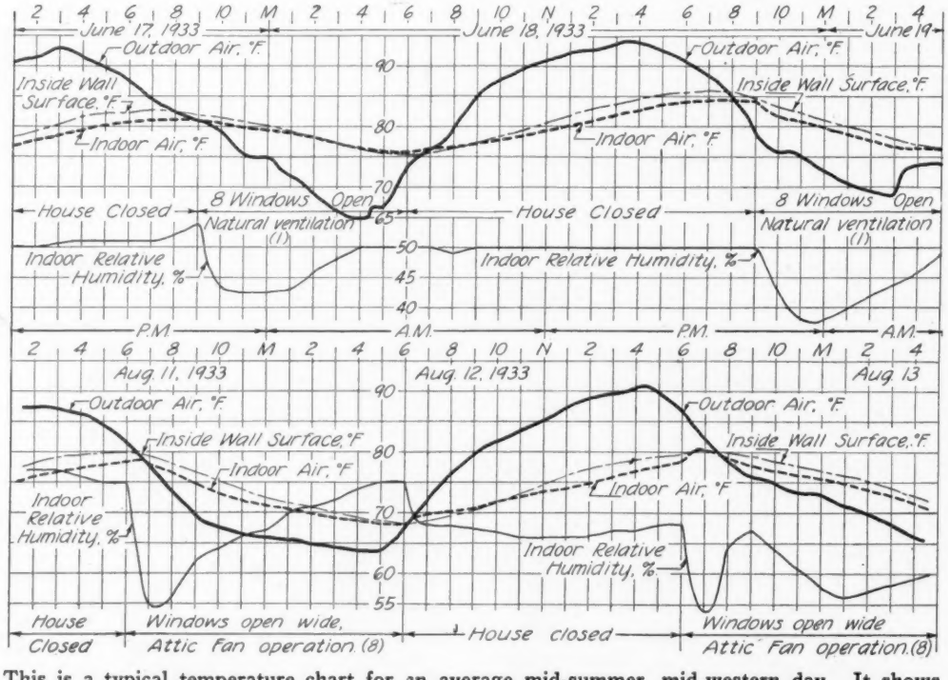
To be just a little more specific, weather bureau records shows us that: 1—the maximum outdoor temperature occurs usually about 3 in the afternoon. 2—the minimum outdoor temperature occurs usually about 4 in the morning. 3—In the average house, ventilated by opening windows, the maximum indoor temperature occurs about 7 to 9 in the evening. (This is about 3 to 5 hours after the hottest hour of the day.) 4—The minimum indoor temperature usually occurs 6 to 7 in the morning where natural ventilation and cooling takes place.

The maximum cooling effect we can hope to gain through night air cooling is to reduce inside temperatures to the same temperature as the air outdoors.



Temperature curve for a typical good night air cooling day. Note the drop in outdoor temperature at night.

Usually this is not possible, but by means of a suitable and large enough ventilating system we can reduce indoor temperature to within 3 or 4 degrees of the outdoor temperature.

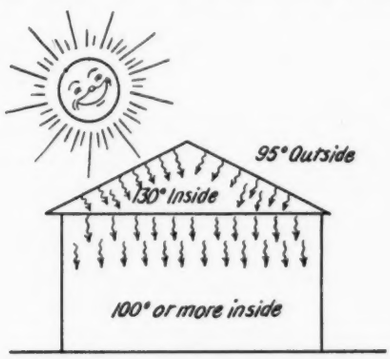


This is a typical temperature chart for an average mid-summer, mid-western day. It shows outdoor and indoor temperatures with natural ventilation; also temperature of the walls; indoor and outdoor relative humidity. In this chart lies the basis for night air cooling.

A pertinent question is—"how much of a drop in outdoor temperature takes place?" Weather bureau records state that on the usual summer day the outdoor temperature drops from 20 to 25 or more degrees from the 4 P. M. peak; after which drop the outdoor temperature starts to rise early in the morning. Nights when the outdoor temperature does not drop at all are very rare. The scheme, then, is to bring into the house this cooler night air in such quantities that the interior is quickly cooled.

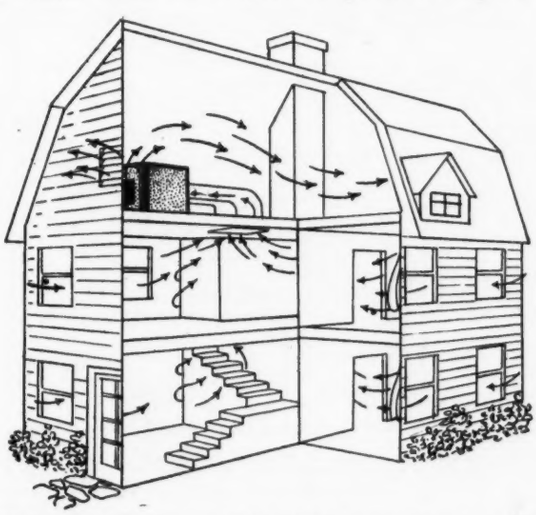
So much for the underlying theory.

The practical side to the proposition is how can we drop inside temperatures along with the drop in outdoor temperatures? And the answer is by ventilation.



This shows what happens when the sun beats down on an unventilated attic. The attic temperature is not at all unusual. When unventilated, the attic acts as a huge radiator.

To appreciate the problem let us consider for a moment what makes a house hot. During the day the sun beats down on the roof and the sides heating up the material of the structure. Materials of the walls may reach a temperature of 90 degrees or more, while some types of roof may reach 160 degrees. When the mass of materials is once heated up it requires a considerable time for the house to cool off. In fact they do not begin to cool until after the outside temperature drops several degrees below the maximum. In winter when the outdoor temperature may be 70 or 80 degrees below inside temperatures it takes quite a while for a house to cool off. In summer the difference may be just a few degrees so we can appreciate that it takes a house longer to cool off in summer than it does in winter.



When we install an artificial night breeze the air rushes in the windows—is blown out by the fan—thus increasing many times the cooling effect of air from the outside. The plan won't work unless outdoor temperatures are lower than indoor temperatures.

During the day, also, hot air from outdoors leaks into the house, heating up everything in the interior. This air inside and the furnishings must also cool down before the interior gets comfortable.

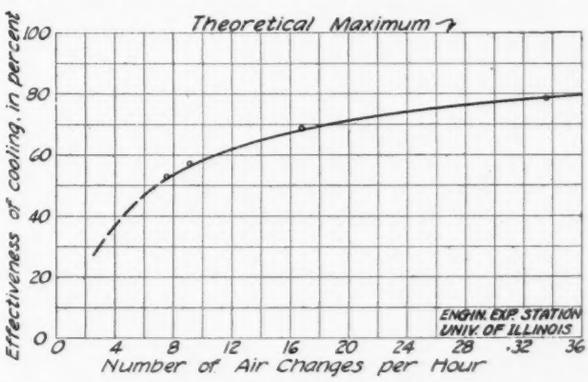
After the sun goes down and the outdoor temperature starts to drop the materials of the house start to cool off; the outside skin cooling first. It takes hours for all the materials to cool down because the difference between the maximum temperature of the materials and the outdoor air increases slowly. So long as the house materials are hot it is difficult to get the interior cool.

Artificial Breeze

The thing we are after is to accelerate the cooling. We all know what happens when a brisk breeze springs up in the evening after a hot day. We throw open all the windows to let the cooler air pass through the house. The breeze sweeps out the accumulated hot air and begins to cool off the inside surfaces of the walls, floors, ceilings and furnishings.

Night air cooling is artificial breeze.

We create this artificial breeze by means of a fan or blower. To effectuate the cooling, our fan pulls into the house the cooler outside air. This draft of air does two things. First it sweeps out the accumulated hot air and replaces this hot air with the cooler outdoor air. Second, it increases the air movement over hot ceilings and walls and accelerates their cooling process.



Increased cooling effect by night air cooling is proportional to the number of times an hour we change all the air in the house. Note that we can't cool with heating season air changes.

The first problem of design is to determine how much air we need. Tests of night air cooling at the Research Residence at Urbana, Illinois, show that the maximum cooling effect is obtained when we pull through the house an amount of air equal to the total cubic feet of air within the house every two minutes (in other words between 30 and 35 air changes per hour.)

We first determine, then, the cubic feet of space in the house. We divide this cubage by two and obtain the amount of air we introduce every minute. However, such an amount of air may require a very large fan.

(Continued on page 48)

Automatic Control For Cooling Systems

[Water Cooling]

The automatic control of cooling systems is a problem of selecting apparatus and hookups suitable to the method of cooling employed. Thus a different system and different apparatus are needed for water cooling as compared with refrigeration. This article discusses cooling with cold water (either a coil or sprays) and the control methods found most satisfactory.

IN the first article (May, 1935) of this series dealing with control of summer cooling systems, we presented the general problems and several methods of controlling attic and furnace blower summer ventilating systems wherein outside night air is utilized to reduce inside temperatures.

In all probability the contractor talking cooling will find the second most popular idea to be the use of cold well water because, like outside air, the public seems to think that air and water are free or cheap; hence a system which uses air or water as the cooling medium should be cheapest to install and operate. That there are extenuating circumstances to this idea every contractor knows full well.

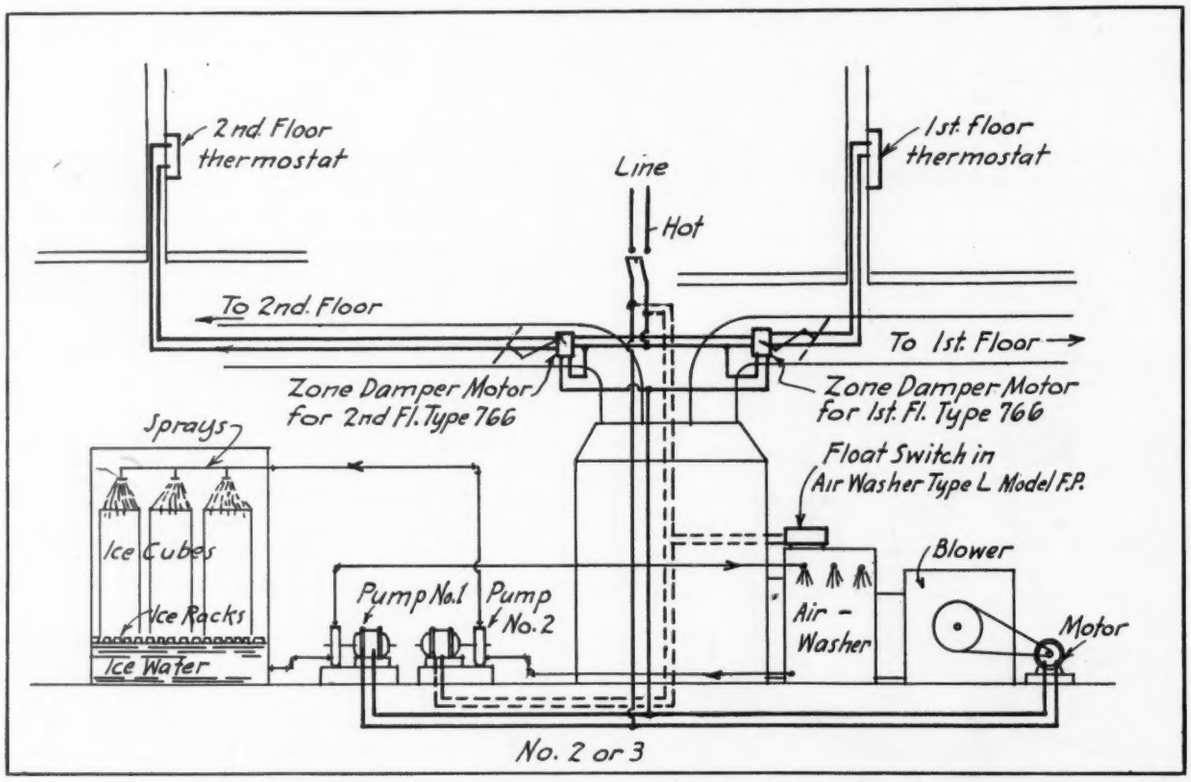
We will, therefore, deal in this second article with controls for cold water. There are two general sources of such cold water—a well on the property or very cold water from a close by municipal well where the municipal supply comes from deep wells. The second is cold water from an ice storage tank in the house.

Because the general problem of control is practically identical for both well and ice tank water we will treat control of these two systems as one problem, pointing out any differences as we go along.

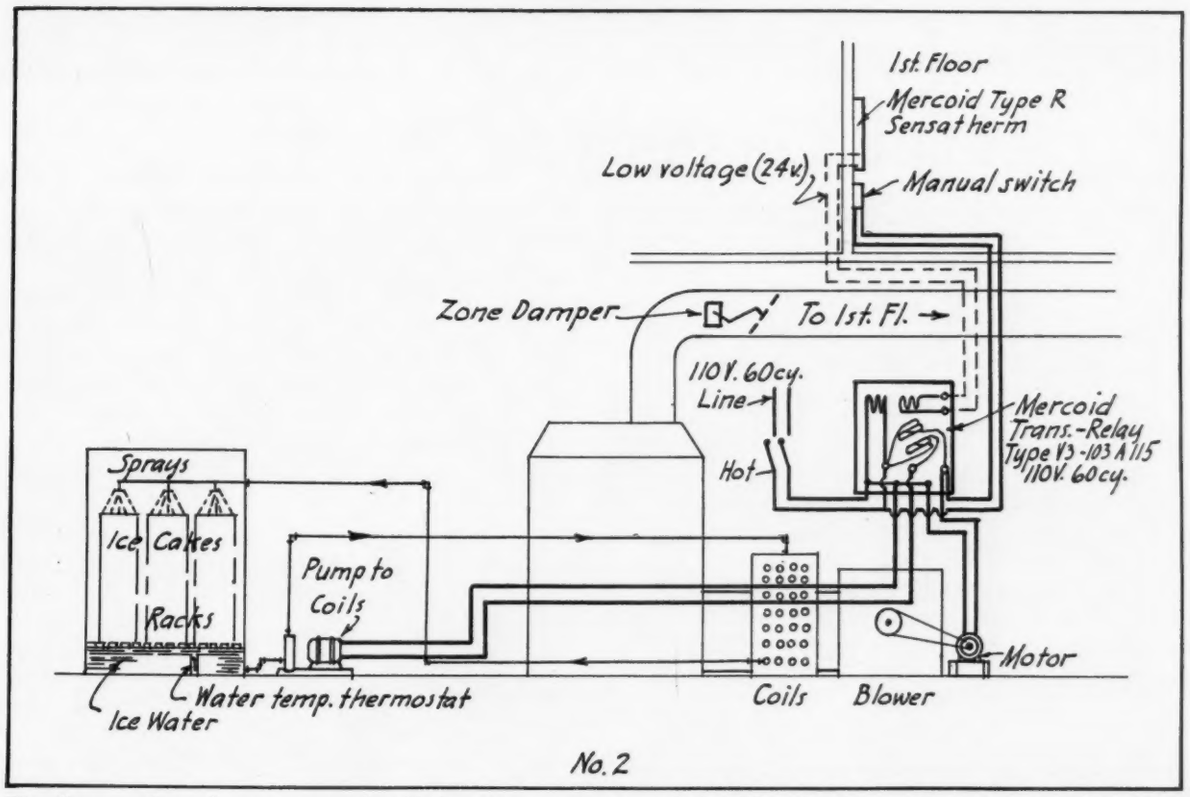
In order to understand the general problem let us consider just how such a system is laid out and how it operates. The first piece of apparatus required is the fan or blower. We will in all cases place this machine in the basement and connect it to the existing heating supply and return system where the heating plant is warm air or install a system of supply and return air ducts where the heating plant is steam, vapor or hot water. Something more will be said a little later about the size of the blower required as compared with the heating system blower.

The second piece of apparatus required will be the unit spray washer or coil which cools the air—the water is only the indirect medium since it cools the apparatus which cools the air. This is a rather broad picture, but will be explained in detail.

The third necessity is our distribution system (ducts, registers, returns).



The diagram above shows a suggested control system for Penn Electric Switch Co., instruments for cooling with sprays or coils. The fan runs intermittently. When the thermostat calls for cooling it opens a water valve to the coils or starts a pump for the sprays. The thermostat also opens its zone damper and starts the fan.



The diagram above for a one-zone installation shows apparatus of the Mercoid Corp., wired for intermittent fan operation and coils. Whenever the thermostat calls for cooling it opens the zone damper, starts the fan and starts the pump which supplies water to the coil, or opens a valve to admit water if there is no pump.

At the present time there are two types of cooling apparatus in general use. The first is the spray chamber or air washer. The second is the cooling coil. In the washer the cold water from the well or ice tank is sprayed in as near a mist as possible into the chamber while the air from the blower is blown through the chamber and thence on out through the ducts and into the room. If the water comes from a well the well pump, working through its storage tank, maintains the pressure required to force the water through the nozzles. If an ice tank is required we have two methods of cooling the water for the apparatus. In the first system the water is sprayed over the ice which cools the water. This cold water accumulates in the bottom of the ice tank and is then pumped through the spray nozzles of the washer. From the washer the water not carried away by the air is picked up by the pump and recirculated again and again. Because this water will be colder than the condensation temperature of the air from the house, we generally accumulate more water than needed so some is drained away.

Floating Ice

In the second system the ice is floated in a tank full of water. The immersed ice cools the water to ice temperature (32 degrees or lower). The water for the washer or coil is pumped as needed from the tank and returned from the washer or coil after passing through the washer sprays and coils.

Endless argument might be presented on the merits of spraying water over ice as compared with immersing the ice in a tank of water. Additional endless argument can be presented for and against the washer. The chief point of advantage is that a washer is claimed to impart a quality to the air not obtainable by any other means. The chief disadvantage is that to cool a large volume of air we need a large washer (one much larger than the small domestic washers popular a few years back for cleaning and humidifying). Also nozzels clog up and cause trouble.

The apparatus becoming increasingly popular for domestic cooling today is the cooling coil. This generally is a finned tube type of coil affording rapid heat transfer. The cold water passes through the tubes of the coil while the air passes through the coil giving up heat to the thin fins. Since the air never comes in contact with the water it is possible to cool with much higher water temperatures than with sprays for we do not add humidity to the air even though we may not dehumidify. Water is pumped through the coil by the well pump or by the ice tank pump.

General Problems

With these general characteristics of water cooling in mind we can visualize the problem of control. The problem is made clearer by picturing a two story house which we plan to cool. Let us say that the owner wants the first floor cool during the day and the second floor cool at night and desires to buy only such apparatus as will be required to fully cool one floor or the other at a time.

With such a problem we will design for two cooling zones—the first floor as one and the second floor as the other. Dealing with one zone as typical of both we see that we can do two things. First we can run

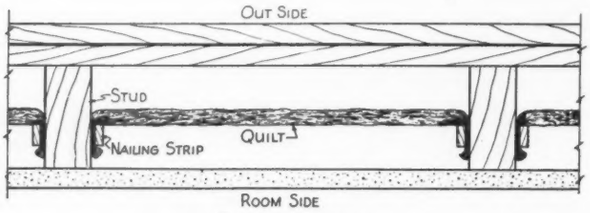
(*Continued on page 50*)

Insulation For House Construction*

By J. D. Hoffman
Professor of Practical Mechanics
Purdue University

[Part 2]

THE heat passing from t to t_1 in the average wall crosses the stud space to the outside finish. This transference may be checked by inserting linofelt, thermofelt, Cabot's Quilt, etc., between the inner and the outer wall finishes, as in Fig. 3, or by filling the spaces between the studs with loose fiber materials such as rock wool, mineral wool, etc. Linofelt, thermofelt, and Cabot's Quilt are fibrous materials about ½-inch thick between layers of heavy paper. The heat transmission coefficient of each of these is about 15 per cent less than that of fiber board forms such as Celotex, Maftex, etc. Rock wool and mineral wool are loose mineral fibers put to place in bulk form without



Quilt Insulation
Fig. 3

being compressed. Either of these two methods (quilted fiber or loose fiber) can be recommended for the space between the studs. When insulations such as these are to be selected, it would be well to consider their water-proof and fire-proof qualities.

The usual outside finish between t_1 and t_0 is 13/16-inch sheathing, building paper, and lap siding. This makes a very satisfactory combination when the sheathing boards are properly made and placed. The paper is usually not considered in the heat loss calculation but is counted as a good measure feature only.

Poor Wall Construction

Too many houses have sheathing with butt joints, as in Fig. 4. This is defective in that the boards may not be a good fit on the edges; but even if the joints are well made when nailed to place, they will not remain so because shrinkage will open the joints and cause defective insulation. A ship-lap joint as in Fig. 5, or a tongue-and-groove joint as in Fig. 6, should be used instead. The ship-lap joint is cheaper than the tongue-and-groove joint and is quite generally used. In either case shrinkage will not open the joints. Some builders recommend the substitution of fiberboards for the sheathing. This is a questionable practice. The outside finish should be sufficiently strong to protect the house frame from twisting. As yet we have no better material for this than 13/16-inch wood boards. Fiber boards will be satisfactory as insulation, but the substitution will probably be made at a sacrifice of strength and rigidity. Insulating materials are not as frequently applied to the outside finish as to the inside.

The insulating qualities of the average framed wall are usually more or less defective because of the circulation of the air from the stud spaces to the attic when these spaces are not closed at the attic floor line. This condition is made decidedly worse when these same spaces are open also to the basement air at the first floor line. See Fig. 7. The heat passing from t to t_1 (Fig. 2) warms the air in the spaces and creates convection currents which carry this heat to the attic and waste. Six to eight dozen of these little chimneys, acting constantly, very effectively assist in reducing the room temperature and increasing fuel costs. All studs spaces should be closed at both top and bottom.

How this closure will be made depends somewhat upon the use to which the attic will be put. In many

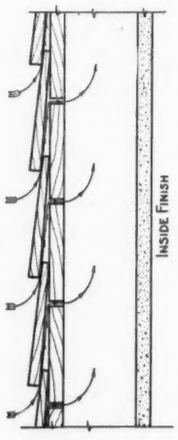


Fig. 4

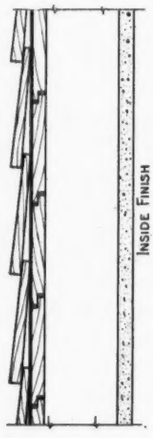


Fig. 5

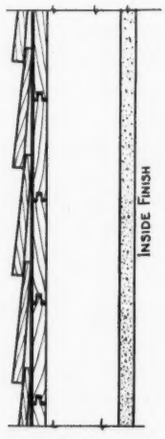


Fig. 6

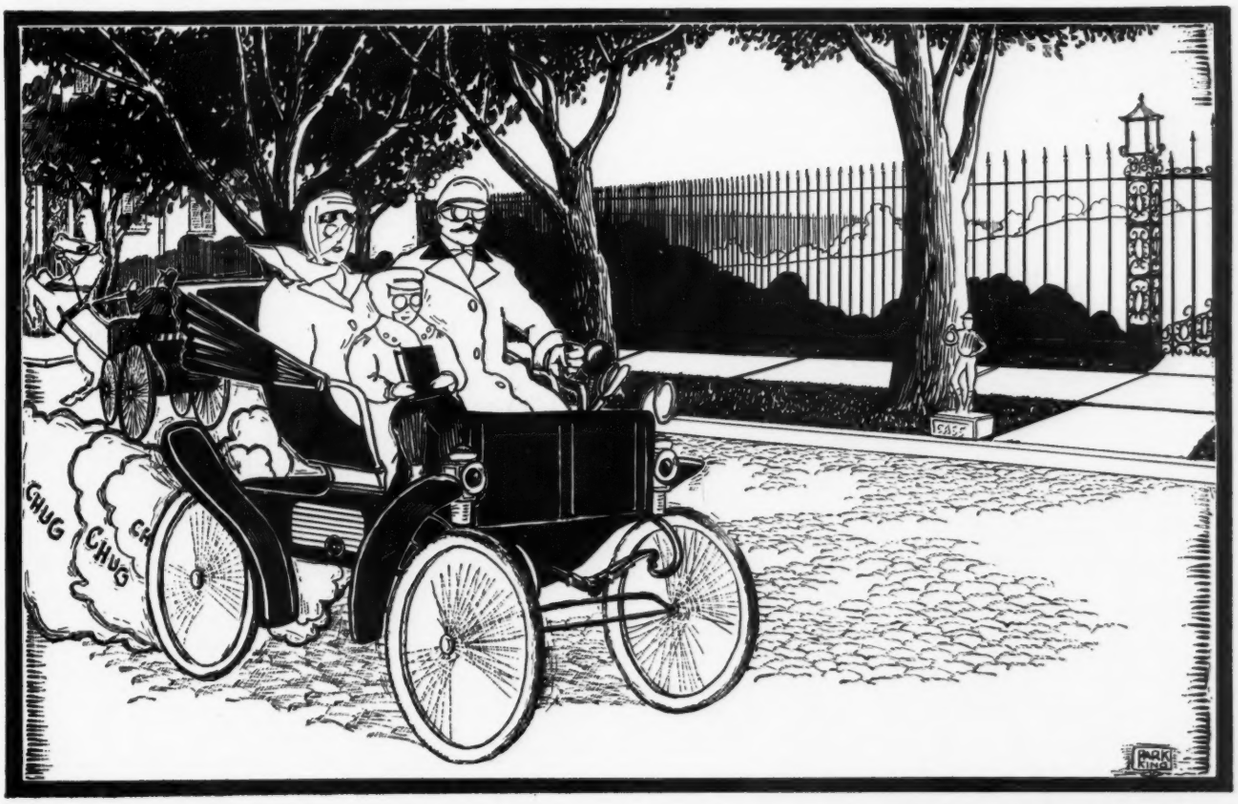
cases this attic space is to serve no purpose except for convenience in running conduits for lighting circuits. When this is the case the joists for the attic floor are laid upon the double 2 x 4 plate surmounting the side wall studs, as in Fig. 8, and the stud spaces are thus fully closed by the inside and outside finishes.

In the more recently built houses the attic floor joists are frequently lowered below the double 2 x 4 plate by notching-in to the studs a ribbon plate, several feet below the top of the studs, and laying the joists on this ribbon plate. This construction permits

(*Continued on page 46*)

Reprint of Extension Series No. 31, Engineering Extension Department, Purdue University.

CHUG CHUG CHUG
A JERK AND A JOLT



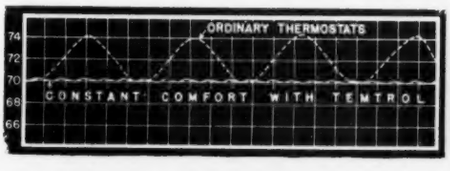
If you've studied the temperature chart of a conventional thermostat, you know what we mean. It fires the heating plant by jerks and jolts . . . never gives smooth, even temperature control. There's overheating and underheating resulting from burner operations too long and too far apart, and like the old-time "one-lunger," it can't be adjusted either.

Penn Temtrol, the modern heat control, is as flexible and smooth in its performance as the sixteen cylinder modern motor car. Equipped with the special Temtrol Cycle-ator, it may be adjusted to the individual requirements of each installation. The frequency and duration may be regulated for burner operation as short as a few minutes or as long as desired. It is the first and only heat regulator to recognize the fact that True Comfort Begins in the FOUR FOOT ZONE. It has been designed for mounting low on the wall, and its exclusive principle of HEAT ANTICIPATION is the only type of operation that can maintain constant comfort without manual adjustment . . . regardless of weather changes . . . in the FOUR FOOT ZONE . . . where we sit and rest and play.

Progressive dealers will tell you they can't afford to be out-of-date. That's the reason they have standardized on Penn Temtrol and other simplified Penn switches for heating and air-conditioning. Write today for the Black Jacket Catalog which describes the complete line of Penn Automatic Controls, and the Temtrol selling aids. Penn Electric Switch Co., Des Moines, Iowa.

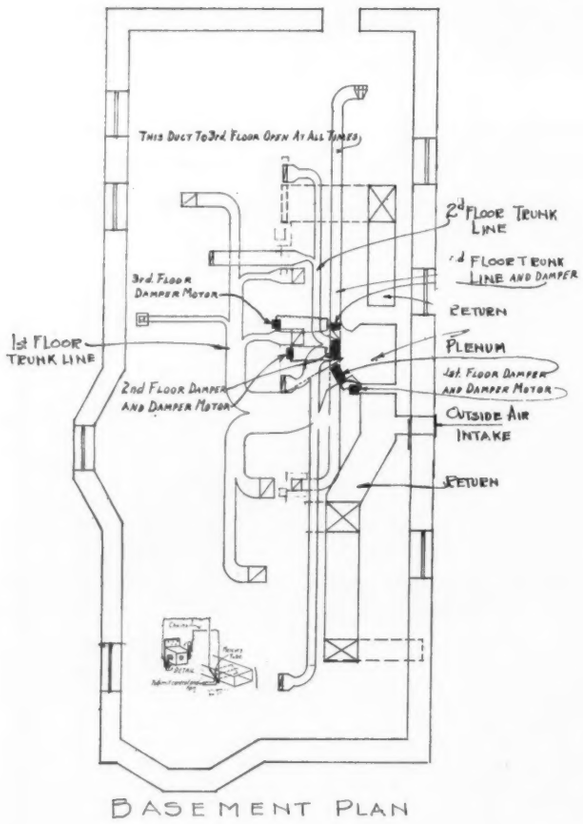
MODERN TEMTROL
Designed and pioneered especially for mounting low on the wall (20 to 36 inches above floor). Straight line temperature control is obtained through Temtrol's exclusive principle of HEAT ANTICIPATION.

CYCLE-ATOR
No two heating jobs ever are alike. That's why Temtrol incorporates this flexible adjustment feature . . . Cycle-ator. Frequency and length of firing periods may be accurately regulated to meet the requirements of home or heating plant.



PENN

IF IT'S PENN, IT'S RIGHT



BASEMENT PLAN

Air Conditioning For Radiator Heated Houses

[Automatic Control]

By Platte Overton

One of the problems anticipated in the American Artisan test house (using a boiler and heat transfer coils) concerned suitable methods of controlling the system which was designed for zone distribution and zone control. This article describes some of the problems which developed and the solutions worked out.

WHEN the AMERICAN ARTISAN test house was first planned, the testing staff appreciated the fact that control of the system would probably be one of the interesting problems. That this feeling was warranted has been proved during the past winter as this report of the experiences of the testing staff with the various types of control systems tried out will indicate.

In laying out the system the original intention was to install in the fan housing a by-pass damper underneath the heating coil. This by-pass damper would open when all room thermostats were satisfied. This would allow tempered air to mix with the heated air passing through the coil and reduce the inlet temperature at the registers. The purpose in so by-passing part of the air around the coil was to make it possible to operate the fan continuously. It was hoped that by changing the outlet temperature, in other words, changing the proportions of hot and tempered air, the room temperatures could be maintained at a practically constant level. No provision was made in the original plan to control this damper as the staff appreciated that if the damper was automatically controlled it might infringe somewhat on the so-called auditorium patents. It was also appreciated that manual control would be extremely unsatisfactory and so the problem was left until the system was finally placed in operation.

As stated in previous reports on this test house, the building has three apartments—first, second and third floors. Each apartment has a centrally located thermostat which is connected to a damper motor in the basement. The duct system was so divided that each apartment has its own main ducts from which branches serving various rooms are taken. A damper is placed in each main trunk line as close to the heating plenum as possible. These dampers were purposely cut somewhat smaller in area than the inside area of the ducts so that under constant fan operation a small amount of air (approximately 10 per cent) could pass around the damper when the zone was closed, thus permitting the fan to run continuously, but increasing the load on the fan so that the consumption of power when the dampers are closed is practically negligible.

Zone Dampers

The particular type of zone damper motor used has arms which make a 180-degree circle. A system of chains and pulleys was installed so that the damper motors could be located remotely from the zone damper and fastened to structural parts of the house. Wherever possible, the pulleys were also attached to joists and beams so that the entire movement required to move the zone damper is smothered by the house structure and not by the duct system. Some little ingenuity was required in order to give straight pulls on the chain, but the final outcome was a system which has proved entirely satisfactory.

Under the original control plan the fan was operated continuously. Each apartment thermostat controlled its own zone damper and when any one apartment called for heat the zone damper to that zone opened. In order to give one relief zone the trunk line to the third floor apartment was divided into three runs—the rear run which passes up through the first and second floor unheated pantries is always open so that so long as the fan runs a full duct volume of air passes into the rear part of the third floor apartment. When the third floor thermostat is satisfied all of the runs to the third floor are shut off with the exception of this run to the rear kitchen.

When the test system was first installed some little trouble developed due to the operation of the heating coil. Some of the difficulty encountered with this coil and the final installation of two coils with reverse hot ends has been reported previously. The bonnet which houses the coil is restricted in area so that the area of the coil plus the area of the mixing damper occupies practically all of the outlet space of the plenum chamber.

It was anticipated that with constant fan operation, or even with intermittent fan operation, some provision would have to be made for stopping the fan should the bonnet air temperature get too low. This introduced the problem of how low can the bonnet air temperature go and still result in air which does not feel cold at the register.

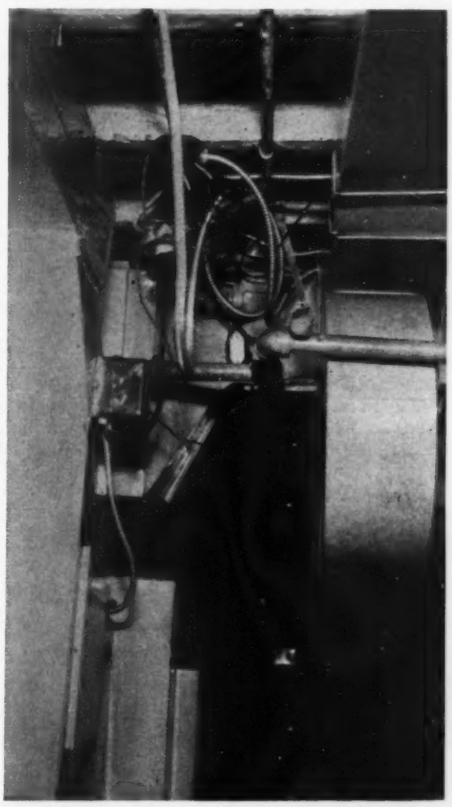
Problems of Limit Control

No definite information on a system of this kind could be discovered so the testing staff had to fall back on experience gained in last year's tests with warm air furnaces. There was also some question as to what would be the total temperature drop in some of the long, rather small runs. With these ideas in mind the testing staff selected a bonnet limit control and placed the instrument as close to the face of the coil and as high up in the plenum chamber as possible.

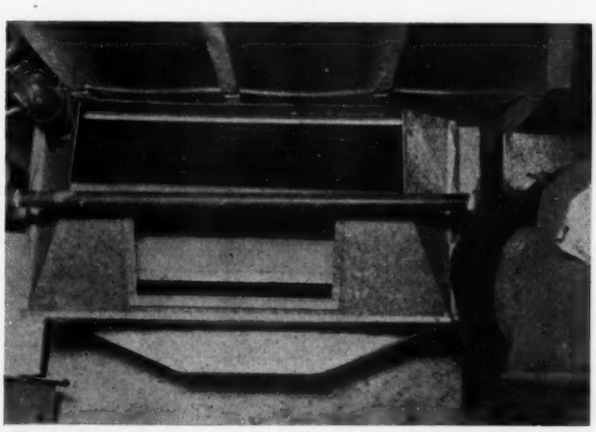
The instrument was set for approximately 100-degree air assuming that air lower in temperature than 90 degrees might be uncomfortable where high velocities were encountered. A problem developed immediately with the fan limit control because the particular instrument selected had a comparatively narrow differential between high and low. Field tests indicated that the differential was approximately 15 degrees. It was quickly discovered that the temperature of the air issuing from the heating coil dropped from 190 degrees to around 120 degrees in the matter of two or three minutes whenever a zone opened. With such a temperature drop in the air coming through the heating coil, the limit control having only 15 degrees of differential did not prove satisfactory.

Another limit control having a differential of 45 degrees was installed in place of the original control. It was at this time that the second heating coil was also added and while the temperature drop through the coil was not as severe as at first encountered the temperature drop was found to be more than the 45 degrees covered by the limit control differential. Several locations for the limit control were tried out, but all locations indicated the same drop in temperature. This indicated to the test staff that the temperature of air coming through the coil was very uniform, but that just as quickly as the zones opened and the full volume of air was permitted to pass through the coil the steam condensation was quite considerable and the temperature drop in accordance.

As a final resort a limit control with a variable differential up to 300 degrees was installed. This instrument overcame the problem of securing a differential sufficient for the temperature drop of the air coming through the coil and under ordinary circumstances worked quite satisfactorily.



In the first control installation a fan limit control was placed after the heating coil, projecting through the plenum as shown here. Because of a narrow temperature differential, fan cycles were too frequent and too short. Also after average fan "off" periods the fan would not start because of no air flow through the coil.



The heating coils are installed in a tight plenum chamber with the blower below. It was found that there was no gravity flow through any part of the coils.

However, during the time these changes in apparatus and locations were being made it was also discovered that when the fan stopped there was practically no flow of air through the coils. At this same time the system was changed from constant to intermittent fan operation and despite the fact that the problem of temperature differential in the limit control had been satisfactorily solved this solution did not take care of the problem of no air flow through the coil when the fan was idle. Tests were made over the face of the plenum chamber to determine whether or not any particular area was subject to gravity flow.

(*Continued on page 44*)

Facts From Research Residence

(*Continued from page 33*)

design velocities and the actual mean velocities existing in the ducts. In spite of this fact, however, no difficulty was experienced in balancing the plant with dampers and in obtaining satisfactory results, from the standpoint of maintaining the room temperatures desired and of equalizing temperatures in the different rooms. The evidence supports the conclusion that the forced-air system has a wide range of flexibility, and that variations in air temperatures in the various parts,

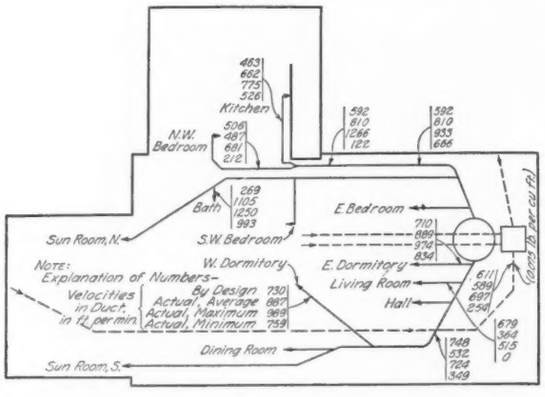


Fig. 3—Design velocities and actual velocities in ducts in installation No. 11. Design velocities are based on 135-degree F. air temperature in ducts and 2320 c.f.m. (at 70 deg. F.) air delivery by fan. Actual velocities were determined with 2100 c.f.m. (at 70 deg. F.) air delivery by fan. Velocity traverses of the duct were made by 12- or 16-point determinations at each section with Wahlen gage. Readings are corrected to air density at 135 degrees F., density 0.067 pounds per cubic foot.

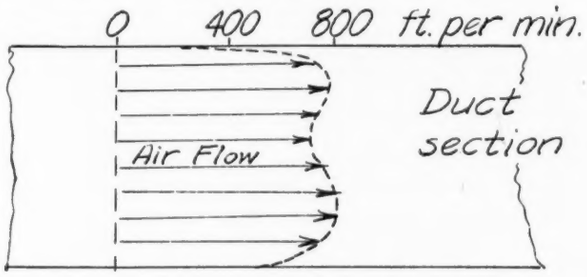
or in the system as a whole, are easily adjusted by compensating variations in the amount of air flowing.

That is, the heat delivered is a function of both the weight of air flowing and the temperature of the air, and the large number of possible combinations of these two factors resulting in the same heat delivery offers a wide range from which to select in making adjustments.

In most cases, the actual mean velocity was less than, or did not greatly exceed, the 750 ft. per min. on which the design was based. In the branches to the two dormitories, and the bath room, however, mean velocities of approximately 890 and 1100 ft. per min. respectively were obtained. Even with these high velocities no appreciable air noise was evident. *The 1100 ft. per min., however, may be regarded as the threshold velocity since a faint swish of air was barely audible with the ear placed close to the register face.* No noise from the fan, either mechanical or due to air velocity, was noticeable at fan speeds below 500 rev. per min. Some noise was noticeable at speeds between 500 and 600 rev. per min. and at speeds above 600 the fan was decidedly noisy.

Low mean velocity in the duct does not necessarily offer a criterion that no noise is possible. This is illustrated by the observation made near to and downstream from the damper in the extreme north trunk shown in Fig. 3. In this case, the mean velocity was 810 ft. per min. but the maximum velocity in the air stream was 1266 ft. per min. and the minimum only 122 ft. per min., or a variation of 10 times between the maximum and minimum. In this particular case no noise occurred because the damper presented a smooth rounded surface producing a streamline effect. The presence of a less advantageous fitting at this point would almost certainly have resulted in noise.

The flow at nearly all points was characterized by considerable differences between the observed maximum and minimum velocities in the stream. The flow of air in a duct can be represented by a velocity contour, such as that shown in Fig. 4.



Typical example showing irregularity of air velocity across a duct section.

Generally speaking, it is never possible to obtain absolutely uniform velocities of the air at every point, when the air is flowing through a duct. Due to the resistance offered to the air flow by the duct surface and due to the turbulences and swirls produced by bends and dampers, the air flow is anything but uniform. This in itself is of no great concern to the designer, but the *maximum* velocity attained by the air flow does concern him. Frictional losses of pressure are probably dependent more on the magnitude of the maximum velocity than on that of the average velocity. Noise conditions are similarly dependent on the maximum velocity.

Little can be done by the designer or installer of a duct system in the way of equalizing the velocity of the air stream in a duct. Careful attention to details of duct design, and the use of stream-lined fittings, large radius bends, smooth transitions, and turning vanes will do much to even out the flow and thereby lesson both frictional losses and air noises.

III. Performance of the Plant

On account of the inherent difficulties in obtaining proper values of temperature and air weights during the on-periods and off-periods of the fan, it was not possible to obtain the actual efficiency and capacity of the furnace during periods of intermittent fan operation. The performance of the plant was therefore studied under conditions of continuous fan operation.

The performance curves for the forced-air plant, operated on anthracite and with the fan running continuously, are shown in Fig. 5. These curves are based largely on observations made on two installations, in both of which the air delivery was approximately 1675 c.f.m. at 70 deg. F. Two points at a combustion rate of 1.4 lb. per sq. ft. per hr. were included, based on the first fan installation without filters, for which the air delivery was 2100 c.f.m. These two points are on the curves. These curves in Fig. 5. may therefore be

regarded as characteristic for all of the fan installations used, although one was a single-outlet and the other a double-outlet fan.

In Fig. 5 the performance of the forced-air system has been compared with that of the gravity plant. The volume of air circulated in the former was more than twice that circulated in the latter, as indicated by the top set of curves.

With a given combustion rate, an increase in air quantity circulated through the system is accompanied by a decrease in the air temperatures at the bonnet

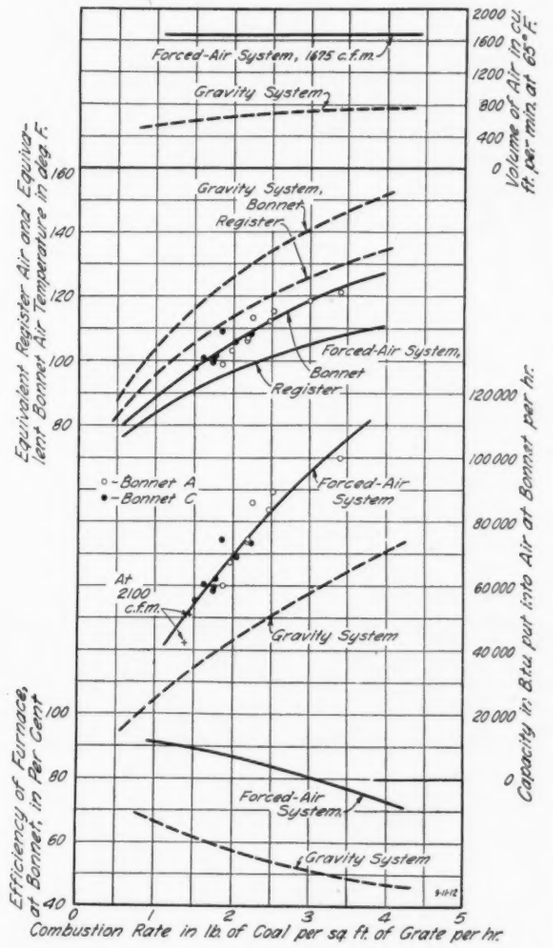


Fig. 5—Performance curves for forced air and gravity installations.

and register. This condition is illustrated by the second set of curves from the top in Fig. 5. It may be noted that the register air temperatures were lower in the forced-air system than in the gravity plant. Furthermore, it can be noted by comparing the register air and bonnet temperature curves that the drop in temperature between the bonnet and the registers was not essentially different in the two plants. For the forced-air system at a register temperature of 110 deg. F. the drop in temperature was 16 deg. F.

Now, the capacity as measured by the heat put into the air at the bonnet increases, 1) when the combustion rate is increased, and 2) when the amount of air circulated through the system is increased. This condition is indicated by the third set of curves from the top in Fig. 5. It may be noted that for a given com-

bustion rate the capacity of the forced-air system was markedly higher than that for the gravity plant.

While the efficiency at the bonnet in the case of the gravity plant ranged from 47 to 70 per cent the efficiency of the forced air system ranged from 73 to 90 per cent. See the bottom set of curves in Fig. 5. In both cases the fuel was anthracite of stove size. The latter efficiencies, although high, are comparable with those reported for installation No. 7 in Engineering Experiment Station Bulletin No. 246, in which 1475 cu. ft. of air were circulated per minute.

Efficiency Vs. Combustion Rate

It should be noted, however, that for both the forced-air and gravity systems the efficiency tended to decrease as the combustion rate was increased. The selection of the size of furnace for any given heating plant is usually based on combustion rates of from 6 to 7.5 lb. per square foot of grate per hour. In the case of the Research Residence plant it was found that, even for the most severe weather conditions, the average combustion rate did not exceed 4-lb. per hour when anthracite was used and did not exceed 6-lb. per hour when bituminous coal was used. By extrapolating the efficiency curves in Fig. 5, one may obtain an efficiency value for the forced-air plant of approximately 60 per cent for a 6-lb. combustion rate and approximately 45 per cent for the gravity plant. The efficiency of the forced-air plant is, therefore, approximately 15 points better than that of the gravity plant. In other words, one may conservatively estimate that *the size of the furnace required for a given installation may be approximately* 20 *per cent smaller when a forced-air system is used as compared with that required for a gravity plant.* The writer does not consider it advisable to make reductions exceeding 20 per cent in the size of furnace.

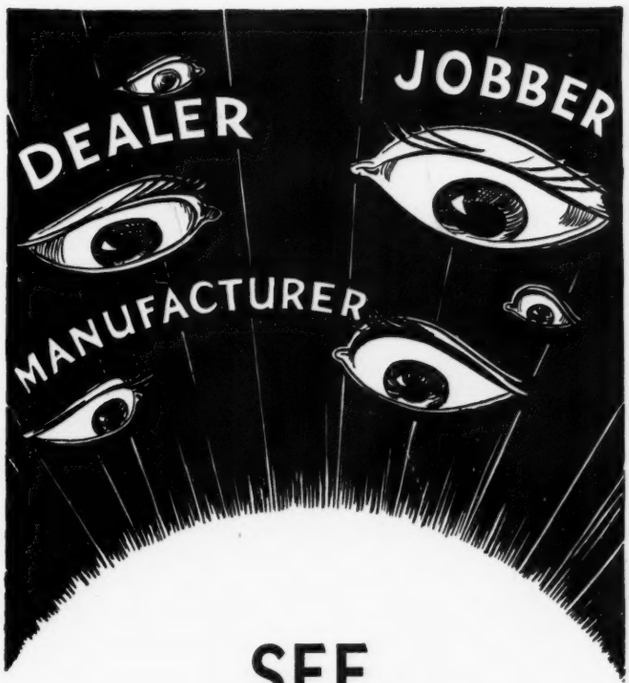
Radiator Heated Houses

(*Continued from page 41*)

These tests did not disclose any location where a bonnet control instrument might be used, so the idea of a bonnet limit control had to be abandoned.

A different type of limit control consisting of a boiler pressure switch with a range from 10 inches of vacuum to 12 pounds of pressure was installed on the boiler from a tee at the pressure gauge. This instrument could be set for any differential desired down to a minimum of about 10 points of pressure differential.

The problem was to establish a range which would permit the fan to run and to stop the fan when the air temperatures got so low that the temperature of air issuing from the register would be objectionable. These tests were also used to establish the minimum differential which might be satisfactory for both cold and mild weather. It was determined that the differential would have to be increased in cold weather and lessened during mild weather. At the conclusion of the test this particular limit control was still in operation and its functions proved entirely satisfactory.



SEE FOR YOURSELF

AIR-PAK

BEAUTY QUALITY PRICE

The Strikingly Different Air Conditioner for New or Old Furnaces

Mail your letterhead NOW for the surprising prices and literature.

Air CONTROLS INC.

1935 West 114th Street
CLEVELAND, O.

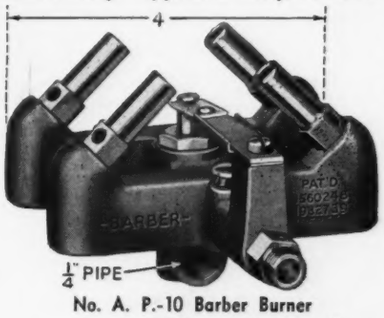
BARBER'S NEW REVISED PRICE SHEET

SHOWING REDUCTIONS UPON

Barber Burner Units
Burner and Pilot Jets
Gas Valves and Fittings
Gas Pressure Regulators

Will stimulate Appliance Sales

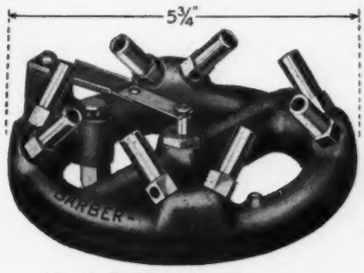
These Net prices, after discount, of the New Patented Barber Units with Safety Pilots are no more than those of good Safety Pilots alone—and remember Hot Water Heaters must be equipped with Safety Pilots after July 1st, if A. G. A. Testing Laboratory Approval Requirements are observed.



No. A. P.-10 Barber Burner

There are over 40 different Standard Models and Sizes of Barber Burner Units, with Safety Pilot Control, of various capacities and 54 without Safety Control. There surely is a specific type for your appliance.

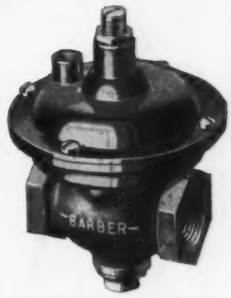
No. P. U.-80 Barber Burner



No. S. P.-15 Barber Burner

No Gas Appliance is better than its Burner—and without the proper Burner no Appliance stands present day rigid tests. That's why leading Manufacturers have adopted Barber Burners with Safety Pilot Control.

Large users of Gas Pressure Regulators have switched to BARBER, after making comparative laboratory pressure drop tests and being convinced that no other make will show as low pressure drop. Their precise machining, assembly, bronze bodies, compactness, and their attractive prices are appealing.



Gas Pressure Regulator

Write us today for these New Revised List Prices and Discounts. Let us have your Gas Appliance Burner problems so that we may aid you in creating satisfied customers.

THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland, Ohio

Insulation

(*Continued from page 38*)

more head room in the attic and gives space convenient for storage, sleeping, or play room purposes. (See Fig. 9.) Where the floor is thus lowered it is very probable that the stud spaces between the floor and the double wall plate will not be closed. (See top of Fig. 7.) Fig. 9 also shows how this space may be cut off by filling in as at A.

This filling could be just as easily made above the joists on the line with the floor, but the spaces between the joists would thus be open to the stud spaces and in case of fire would be a decided menace as the flames would rise through the stud spaces and sweep to the other side of the house through the spaces

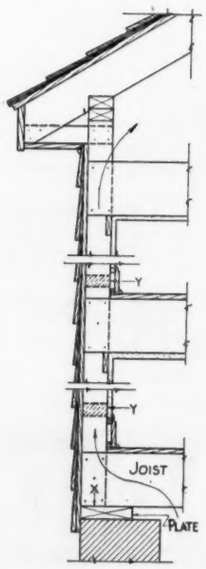


Fig. 7

between the floor joists. Fillerblock A, therefore, serves as a very satisfactory fire stop as well as an aid to insulation.

In many houses the attic is not floored, in which case the fire stop at A is the only solution. Whether or not the attic should be floored is a very important item in the fuel bill and will be discussed later.

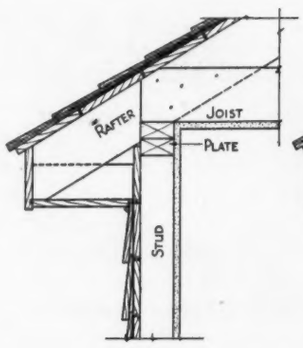


Fig. 8

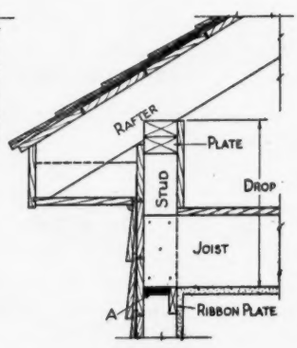
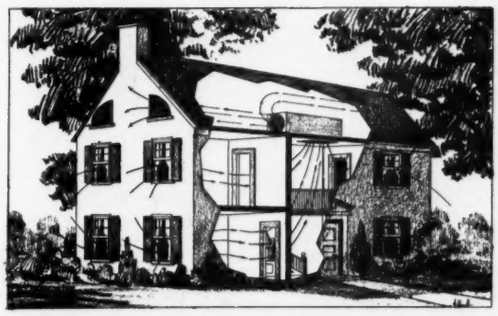
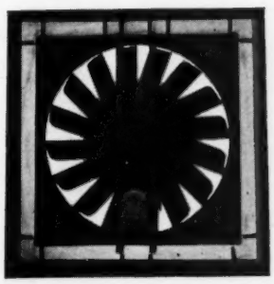


Fig. 9

To be continued



This illustration shows a typical COOLAIR attic installation. The arrangement insures perfect circulation and gentle breezes as the air handled by the fan is pulled through the grille from the rooms below and forced to the outside through louvers and other openings in the attic.



The COOLAIR Ventilating and Cooling System home cooling fan is shown at the left with patented installation features, covered by United States patent number 1,992,112. Note the spring suspension feature, which eliminates all vibration. This feature is just one of the many distinctive COOLAIR characteristics.

COOLAIR

HOME COOLING AND VENTILATING SYSTEMS

The Direct Line to

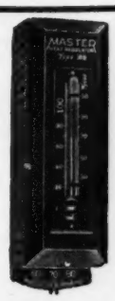
Profitable Summer Sales

COOLAIR Ventilating and Cooling Systems are the real solution to efficient, low cost home ventilating and cooling problems. Because of COOLAIR'S large, slow speed fan and patented spring suspension feature the unit is unique for attic installations. It is easy to install and economical to operate. Every type of home and place of business is a prospect for COOLAIR Ventilating and Cooling Systems. They offer you a real opportunity for summer sales profit. Write for prices and details about attic and other installation features.

AMERICAN COOLAIR CORPORATION •• JACKSONVILLE, FLORIDA

VENTILATING & COOLING SYSTEMS

Only $13.50
to dealer
Type B-22
Two-Position
genuine
MASTER HEAT REGULATOR

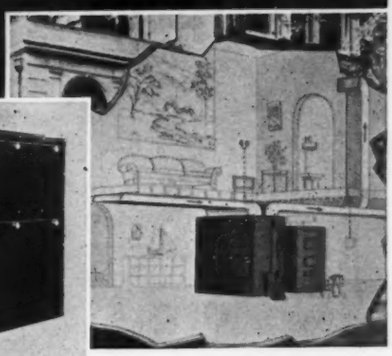


The big estate on River Drive couldn't get a better regulator than a "MASTER" — and here's a "MASTER" priced within the reach of any home owner. Accurate, noiseless, responsive to changes of 1 degree, easy to install and longer-lived than the heating plant. Listed as standard by Underwriters Laboratories. A real business-getter for you.

Made by the manufacturers of the famous Type B-144 the Original Gradual Control Heat Regulator.

WHITE MANUFACTURING CO.
2362 University Ave. St. Paul, Minn.

CLARAGE Duotherm
Complete Air Conditioning For Fine Homes



A Deluxe Unit . . . Nothing Spared to Make It the Best Obtainable

Back of the Clarage Duotherm are sound principles of engineering. Back of this unit is almost a quarter century of experience in air handling and air conditioning.

A Duotherm provides COMPLETE AIR CONDITIONING. It cools and dehumidifies in summer; warms and humidifies in winter—all operations entirely automatic. Steam or hot water can be used as the heating medium; cold tap water or a direct expansion refrigerant for cooling. Filtered conditioned air is distributed through ducts to all rooms in the home. The Duotherm is attractively finished in satin black with bright chromium trim—worthy addition to basement recreational rooms as shown at right above. Still another feature is quietness of operation.

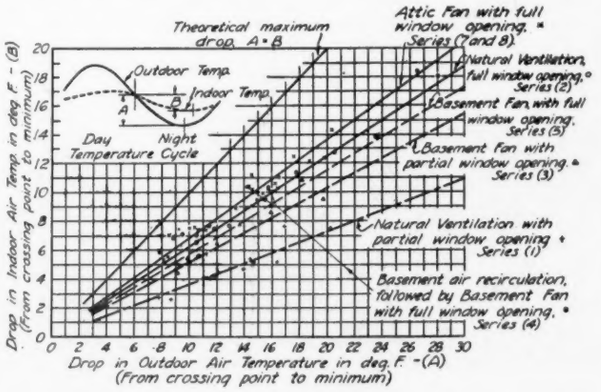
Those people in your community who buy only the very best will be greatly interested in the Clarage Duotherm. Write us for Bulletin.

CLARAGE FAN COMPANY, Kalamazoo, Mich.

Night Air Cooling

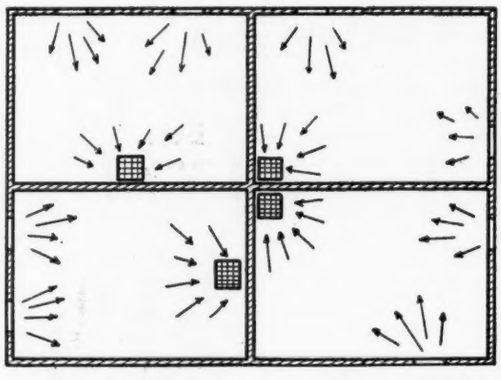
(*Continued from page 35*)

The Urbana tests further show that increasing the air change from zero to 10 changes causes a very appreciable increase in cooling effect. From 10 to 16 air changes further increase the cooling effect just a little less rapidly. Beyond 16 air changes the increase in cooling effect slows up. Therefore, if we design for 16 to 20 air changes per hour we can use an economical size of fan and still secure a large return for our investment. Beyond 20 air changes our fan size goes up sharply and the final effect increases slowly. Generally speaking, then, our design should call for from 16 to 20 air changes per hour. We size the fan by dividing the total cubage of the room to be cooled by three to get the fan c.f.m. for 20 air changes.



The increased cooling effect of an artificial breeze is shown in this chart, which compares several types of ventilation.

The second problem is to determine how this air shall get into the house. The most satisfactory entrance is through windows. The Urbana tests run with an attic fan, with a basement fan and with various numbers of windows open and windows opened varying amounts of full opening, show that the maximum



When ceiling registers are used they should be placed as far away from windows as possible in order to sweep the ceiling air out of the rooms.

cooling effect is obtained when all windows in the house (on both floors of a two story house) are opened. Lesser cooling effect is obtained when fewer windows are opened or when windows are only partially opened. The owner should be advised, then, to open every window in the house as wide as possible.

Modernizing Old Building

(*Continued from page 31*)

The Celotex prevents the noise of the machinery from being heard in the corridor.

"This practically finished our work except for outlet extensions and branch duct which could not be located until the space was rented."

It will be noted from the contractor's description of the fabrication and erection work that every possible precaution was taken to avoid mistakes in sizing and locating the duct work. It was a precaution to take off dimensions from the actual floor layouts. The plan of a typical floor shows the finished runs of main ducts and the outlets from the sides. One of the ducts is shown with shop drawing identification showing the method used to identify the several sizes and types of paneling used. The duct plan also shows the arrangement and location of turning vanes and splitters, the outlets into offices and the smaller ducts which replace one main run in some corridors.

Of some interest to contractors recommending possible alterations for customers are the following points of importance—

1—Very little major cutting and patching was required.

2—A minimum of floor space (12 by 20 feet) on each floor was required for apparatus.

3—Although the system is actually of the central type, each floor is wholly independent of other floors and can be operated as a unit.

4—Because the outlet grilles can be adjusted, each office can maintain the conditions desired irrespective of other offices on the same floor.

5—All apparatus, ducts, piping is hidden as completely as though the building was built new.

◆

Cooling System Controls

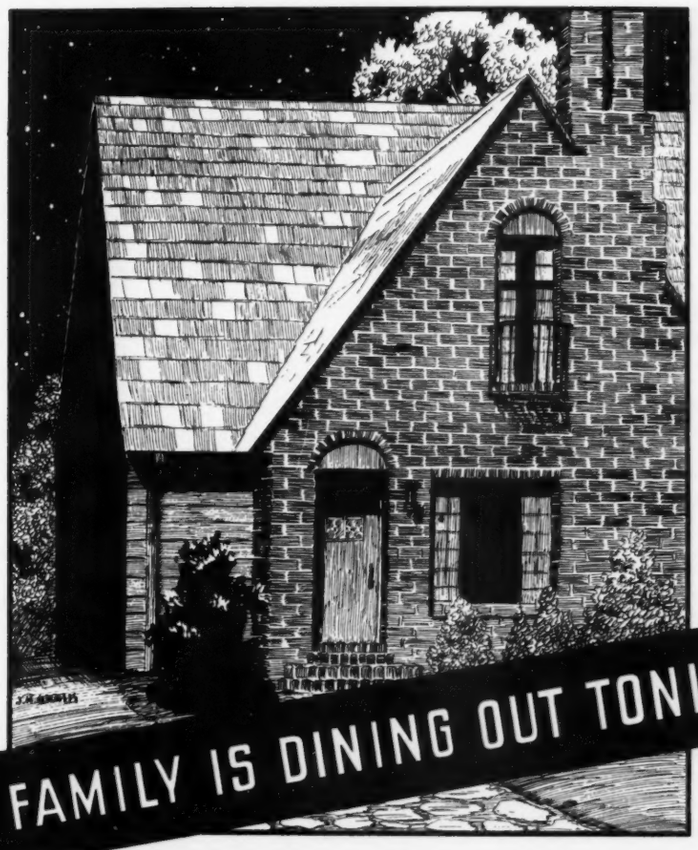
(*Continued from page 37*)

our fan continuously. Or we can operate the fan intermittently—starting it when we need cooling and permitting it to stand idle when the house is cool.

There is nothing complicated about the control arrangements or the apparatus required for any of the above discussed systems of cooling. Where the fan runs continuously the starting and stopping of the pump motor or water valve is handled through a relay or direct if high voltage instruments are used. In a pressure-well system with the fan running intermittently the thermostats open the water valve.

Where the fan operates only when the thermostat calls for cooling, the thermostat can cause the zone damper to open while a switch in the zone damper motor starts the fan. When the thermostat is satisfied the zone damper closes and in closing stops the fan unless the other thermostat is calling for cooling. Some of the special thermostats which have two temperature settings might be used to open the zone damper and on the other change start the fan.

Where sprays are used the second pump which withdraws washer water can most easily be started and stopped from a float contact.



THE FAMILY IS DINING OUT TONIGHT

but the Attic Fan went on at eight

IT'S BEEN A HOT DAY and the Smith family is dining out tonight. The house will be cool when they return for the Attic Fan went on at eight. A Sangamo Time-Switch will turn it on tonight — and every night, whether the family is at home or not. It will turn it off as well, while the family sleeps.

The Smith family can thank the thorough air-conditioning contractor who installed the Attic Fan for giving them a complete installation. The cost was not high, the convenience has given great satisfaction, and it will pay for itself by saving unnecessary hours of operation.

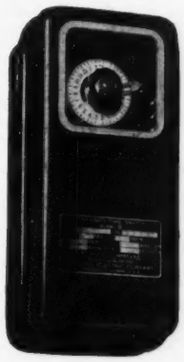
Sangamo Time-Switches have accurately controlled heating and lighting installations for years — and now air-conditioning. Naturally Sangamo was the choice of engineers and contractors when the need was felt for a reliable time-switch in this rapidly expanding industry.

Sangamo Time-Switches are synchronously motored or electrically wound. They are built for years of trouble-free service. Make a Sangamo Time-Switch a standard part of every installation. The added convenience and economy will promote the sale of cooling systems.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS, U. S. A.

FORM K-11 TIME-SWITCH

The Sangamo Form K-11 Time-Switch is ideally adapted to time control of Attic Ventilating Fans. Operated by a high-torque, slow-speed synchronous motor, this dependable single-pole, single-throw time-switch will give years of trouble-free service. It is moderately priced.



MAIL THIS COUPON TODAY

SANGAMO ELECTRIC COMPANY
Springfield, Illinois
Gentlemen:

Send me complete information on time-switches for time control of ventilating fans or any other air-conditioning equipment.

☐ MANUFACTURER ☐ CONTRACTOR

Name.....

Address.....

City.....State.....

Attention of.....

GIVE YOUR CUSTOMERS **COMPLETE** AIR CONDITIONING

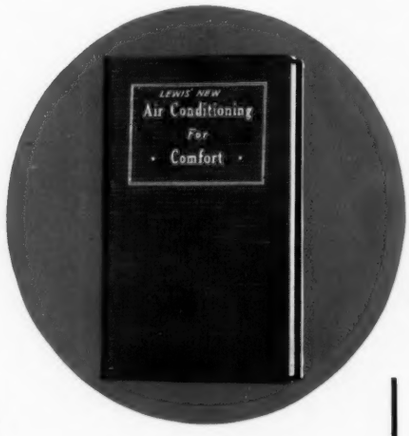
Now Ready » »

LEWIS' NEW

"AIR CONDITIONING FOR COMFORT"

250 Pages—5½x8½—Cloth Bound—$2.50

This book takes the subject of air conditioning completely apart; separately explains each phase in clear, simple language; and then, employing the data given in 13 earlier chapters for all computations, outlines for the reader in complete detail the correct design, first, of a heating and cooling system for a specific residence, and then for a specific large building.



HERE is a new edition of this foremost book on the science of air conditioning—so entirely changed from the original in the light of new developments over the past three years that it is, in all respects, a wholly new book.

In a broader, clearer, and better ordered treatment of every angle of air conditioning, it gives full consideration to all new systems, equipment, and practices which have evolved since 1932, and includes a wealth of new engineering data, gleaned from the most recent experience and research, which supersede much of the data presented in the first edition.

A perusal of the column at the right will indicate to owners of the original edition how much improved and vastly different the new book is. Actually 75% of the material in the 1932 volume has been replaced, and new tables, formulas, charts, and examples of correct computation by the score have been added. Among five brand new chapters is one devoted entirely to the presentation of data on operating costs for heating and cooling.

With this extensive revision, enlarging it and bringing it completely up-to-date, Samuel R. Lewis' book is more definitely than ever the most informative, practical, and reliable book to be had on the subject of air conditioning. A copy should be in the hands of every one interested in or doing air conditioning work.

The new edition will be ready for distribution about June 15th. Send $2.50 for a copy today. You may order with the privilege of returning the book within 10 days for a refund, if for any reason you do not care to keep it.

The Author

Samuel R. Lewis, who has just completed his new "Air Conditioning for Comfort" after several months of intensive work and study, is well known to the air conditioning field as a consulting engineer, and as past president of the American Society of Heating and Ventilating Engineers. Mr. Lewis for many years has been recognized as one of the world's foremost authorities on the subject of air conditioning.

Chapter Headings

Air Conditioning Terminology . . . Air Conditioning Systems . . . Psychrometric Table and Chart . . . Formulas and Methods . . . Humidifying and Dehumidifying . . . Mechanical Refrigeration . . . Air Conditioning and the Human Body . . . Heat Transmission Through Building Materials . . . Design Air Volumes—Infiltration and Ventilation . . . Air Distribution Within Rooms . . . Water Circulation in Heating and Cooling Systems . . . Operating Costs for Cooling . . . Heating Dwelling "M" . . . Cooling Dwelling "M" . . . Heating Building "D" . . . Cooling Building "D".

A Brief Outline of the New Material and Many Improvements Embodied in This Revised Edition

- Definitions extended and enlarged.
- New data on unit ventilating machines, water vapor refrigeration, zoning for temperature control, etc.
- Chapter on psychrometric chart and table simplified and expanded, with profuse examples of their application added.
- A new chapter giving formulas and examples for various psychrometric computations covering both humidifying and dehumidifying.
- New data on various apparatuses used for humidifying and dehumidifying, with illustrations and examples of the application to these apparatuses of the psychrometric data.
- Chapter on mechanical refrigeration entirely rewritten and much enlarged, with new illustrations, including modern centrifugal compressors, pipe sizes for refrigerants, etc.
- Chapter on "Air Conditioning and The Human Body" rearranged and enlarged.
- Tables of heat transmission through building materials brought up-to-date, rates having been increased in many cases since 1932.
- New simplified methods for computation of heat transmission.
- Data on heat absorption from sun and appliances considerably simplified, with all recent changes in computations and values included.
- Material on design air volumes, infiltration and ventilation regrouped and clarified, with new charts and short-cut methods.
- New illustrations and enlarged charts on air distribution within rooms, with revision of material.
- Data on water circulation in heating and cooling rearranged, with several new illustrations and charts.
- An entirely new chapter giving operating costs for heating and cooling.
- Drawings and record sheets used in the designing and laying out of a heating and cooling system for a specific home, entirely new and much simplified.
- An entirely new example of heating a city building which houses different activities, the heating being designed to facilitate complete air conditioning, using forced circulation water, with mechanical ventilating systems for all spaces.
- Complete design computations for cooling and ventilating the city building described in the previous chapter, using the maximum practicable part of the heating and ventilating equipment also described in the previous chapter.

KEENEY PUBLISHING COMPANY
6 North Michigan Ave., Chicago, Ill.

ASSOCIATION ACTIVITIES

Wisconsin

Business conditions for contractors throughout the state of Wisconsin and Milwaukee look favorable so far as spring and early summer work is concerned. Quite a lot of estimating has been done and most contractors have a number of estimating jobs now on their boards. While there has been some little drop-off in the early business, contractors foresee sufficient work to keep their shop forces busy if present chances for bidding are continued.

At the May meeting of the Wisconsin Association the Wagner Labor Bill was considered in detail by the members attending.

In our estimation one of the most successful recent actions of the state body was to join with other building trades representatives in getting the Milwaukee Common Council to have their local improvement work done by contract with regular journeymen rather than by day labor as previously planned. It is assumed that this action will result in more work for local contractors.

Paul L. Biersach,
Secretary.

◆

Florida

The annual meeting of the Roofing and Sheet Metal Industries of the State of Florida will be held at the Miami-Biltmore Hotel, Coral Gables, Miami, Florida, June 20, 21 and 22. This organization was formerly known as the Sheet Metal Contractors' Association of Florida but the name was changed last year.

The officers of the association are: Lewis Moore of Miami, President; Frank E. Helzel of Eustis, Vice-president; Frank C. Ault of Orlando, Secretary-Treasurer.

A cordial invitation to all interested sheet metal contractors is extended by the committee in charge of preparations.

David Sherrill.

◆

Du Page County, Illinois

The May meeting of the DuPage County Warm Air Heating & Sheet Metal Contractors' Association held at Downers Grove, was devoted principally to reports by visitors and members covering several of the activities the association is particularly interested in.

J. E. Peterson, secretary, reported on his trip to Springfield, Illinois, where he participated in activities designed to advance the status of the licensing bill in the Illinois state legislature. Mr. Peterson reported that a number of new advocates of the bill have been secured and, unless something unforeseen happens, passage of the act in due time seems assured.

J. D. Wilder, Editor of AMERICAN ARTISAN, reported on the New York State Association meeting, particularly the discussion conducted at that meeting relating to mail order house competition.

Jake Miedema gave members a report of the Cincinnati conference of the Roofing and Sheet Metal Industries. He gave many interesting sidelights on the activities during the time of the conference and also gave a first-hand report of the voting for National Code Authority committeemen.

The association is considering the establishment of a school for forced air heating.

J. E. Peterson,
Secretary.

◆

Milwaukee

The feature of the May meeting of the Milwaukee Association of Sheet Metal Contractors, was an address on the hazards of our industry, by John Humphrey, a member of the Wisconsin Industrial Commission. Mr. Humphrey explained the need for specific rulings covering all types of cases and gave members attending to understand that full information in booklet form may be secured from the local or state office of the Commission.

At the meeting, the report was rendered that efforts to establish a bid depository for the Milwaukee area had been unsuccessful due to a lack of cooperation by members of the industry. Now that all codes and code regulations have been abolished the association will consider at its June meeting just what should be done about the matter.

Paul L. Biersach,
Secretary.

◆

Indiana

The Indiana Sheet Metal, Warm Air Heating and Roofing Contractors' Association held their Gary district meeting on May 3 at Moose Temple in Gary, under the direction of District Governor, Charles Rood, of Gary.

William Stern, a general contractor, presented an outline of the proposed state licensing bill for general contractors. He explained the causes which have led to the consideration of such a bill and presented an outline of the advantages to be gained by its adoption. A number of visitors from the Chicago area and nearby Illinois cities were in attendance. In accordance with the usual custom, the meeting was preceded by one of the famous Gary fish dinners.

The June 21st district meeting of the Indiana Association will be held in South Bend at the Hotel LaSalle, 6:30 P. M., Daylight Saving Time.

Paul R. Jordan,
Secretary.

◆

Chicago

The fourth annual spring dealer meeting and get-together of the Chicago associations was held under the auspices of the Furnace and Sheet Metal Institute May 24 at the Northwestern Stove Repair Company's northwest side branch.

The principal address of the evening was delivered by P. D. Horgan, Air Conditioning Editor of the Chicago Evening American, a local newspaper. Mr. Horgan has for the past three years been advising readers of his paper on numerous questions concerning air conditioning. The subject of his address was "What is the Market for Air Conditioning." Mr. Horgan described the advance of air conditioning in restaurants and public buildings and predicted that air conditioning, particularly summer cooling, would find ready acceptance by home owners in the near future. He outlined some of the common questions which his readers ask pointing out that most of these questions indicate an absolute lack of basic information on air conditioning and cooling.

Those attending the meeting were also shown a moving picture designed to illustrate the need for better window displays, clean windows and adequate display floors. Drinks and sandwiches were served following the meeting.

Clarence G. Rice,
Secretary.

◆

Fox Valley, Ill.

The regular meeting of the Fox Valley Furnace and Sheet Metal Contractors Association was held on May 12th at the Y. M. C. A. dining room, Elgin, Illinois.

John Mattingly of LaGrange was welcomed into the Association as a new member. Mrs. Frank Davis and her daughter Mabel, who are carrying on the business of our late member Frank Davis, were present at the meeting. Our As-

Association Activities . . . . .

sociation looks forward with pleasure to their regular attendance.

An interesting discussion was held on membership activities and was placed in the hands of Fred Nolting as Chairman.

In the absence of Chairman Fred Goetz of the Educational Committee, President Jack Stowell, reported for that committee and explained several suggested changes in our present "Suggested Retail Price Sheets." He also explained a new sheet metal estimate sheet drawn up along the lines of our present furnace estimate sheet and furnace repair estimate sheet.

Motion was made and passed by members of the association that suggested changes be made in the retail price sheets, new ones be made and mailed to members in good standing. It was also decided to have sheet metal estimate sheets prepared and fifty copies of each sent free of charge to each member in good standing.

It was decided to again hold our annual field day in July. This event will be extended this year to include members and guests and their wives and families. A general program to interest everyone will be announced later by a committee to be appointed.

Walter Eissler,
Secretary.

Milwaukee

The regular May meeting of the Heating and Sheet Metal Contractors' Association of Milwaukee was held May 16. Roger Kirchhoff, chief architectural advisor for Federal Housing Administration, advised members as to what will be required of contractors wishing to obtain Federal Housing Administration loans in order to submit bids on work. The association has been active in promoting work for members through such agencies as FHA.

H. H. Peters,
Secretary.

◆

Chicago

The Master Furnace and Sheet Metal Association held their open night at 7435 Cottage Grove Avenue, Chicago, on Monday evening, May 20th.

This association is carrying on an air conditioning class which meets from 7:30 to 8:30—before the regular meetings—and is conducted by Art Meiche in connection with the officers of the association. After the air conditioning class, Ed. Nemec of the Northwestern Stove & Repair Company, acted as chairman, taking the place of President Bob Chorley, who was ill.

After the business proceedings, Mr. Nemec introduced the guest speaker, D. C. Ellison of Northwestern Stove & Repair Company, who gave the assembly a most interesting talk on how he discovered America. He related his experience in the World War, and how they led to his coming to the United States.

Mr. Nemec introduced Walter Snook of the Chicago Steel & Wire Company, who entertained the gathering with stories and a dance.

The music was furnished by young Malberg, son of Roy Malberg of Republic Metals, Inc., who played the piano and accordion.

After the entertainment, a buffet lunch was served—and a general get-together of the members and guests.

The Master Furnace and Sheet Metal Contractors' Association of Chicago has appointed a committee to arrange for the annual south side picnic.

The Master Furnace & Sheet Metal Association, Inc., of Chicago, is conducting an air conditioning school for its members and others who are interested enough to pay tuition fees. The entire association is responding fully to this activity and the course is designed to cover both gravity furnace installation and forced warm air installation. Enrollment in the classes is on the increase and considerable benefit to the trade is anticipated.

Arthur L. Nelson,
Secretary.

Hood Pattern

(Continued from page 21)

principles better let us imagine the pictorial drawing is a pitched hood for which we wish to develop the patterns; and that the surface is made of transparent material so we can look through and see the base line shown by a-b-c-d, and the altitude or vertical height as A-A'. The hip lines are shown by A-a, A-b, A-c, and A-d. A-e, A-f show the seam lines. With this picture in mind we start our working drawing in Fig. 1.

Plan Fig. 1

First draw the outline of the plan a-b-c-d the required size (in this case four by five inches). Then draw in the hip lines a-c, b-d. Bisect lines d-a, a-b, and b-c as at e, g, and f. Draw the seam line e-f and the center line g-A.

When the base lines of an article are on a horizontal plane, they are in their true lengths as they appear in the plan. The center, hip and seam lines, as they appear in the plan, are not in their true lengths. These lines are known as "foreshortened lines." They represent the base of a series of triangles whose altitudes are equal to the vertical height and whose hypotenuse will be the true length of these lines.

This is made clear by the pictorial drawing and model. Let A-g represent the base of the foreshortened line A-g, Fig. 1, and A-A' represents the vertical height of hood. Then A'-g would represent the hypotenuse or true length of line A-g, Fig. 1.

This principle is applicable in finding the true length of any line where the length of the base line and vertical height are known.

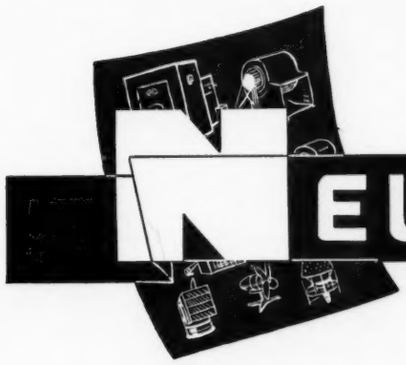
Developing Half Pattern Fig. 3

Start at the lower left-hand corner of the sheet of metal and mark off the distance X equal to three-fourths the line a-e, Fig. 1. Mark off a'-g'-b', Fig 3 equal to a-g-b, Fig. 1. Erect a perpendicular line from g as g-A. Next construct a right angle as A'-A-a, Fig. 2. Make A-A' equal to the required vertical height of hood (in this case three inches). With dividers set from g to A, Fig. 1, place as A-g, Fig. 2. Now set dividers from g to A', Fig. 2, which is the true length of line A-g, Fig. 1, and place it as g-A' Fig. 3.

Set dividers equal to a-e, Fig. 1, using a' and b', Fig. 3, as centers describe the arcs e' and f'. Next set dividers from A to e, Fig. 1, and place it as A-e, Fig. 2. Now set dividers from e to A', Fig. 2, which is the true length of the seam lines e-A and f-A in Fig. 1 and using A', Fig. 3 as center cut arcs e' and f'. Draw lines from A' as A'-e', A'-a', A'-b', and A'-f' completing one-half pattern. All laps for seaming, etc., must be added to the pattern.

When the angle A-e-a in the plan Fig. 1 is a right angle, the angle A'-e'-a' in the pattern must be a right angle also. Cut out the half pattern and bend on the hip lines, then place the formed pattern upon the model. This will help the student to visualize just what he has accomplished.

The patterns for Figs. 4 and 5 are developed by the same process. It is very important that the craftsman study the principles set forth in this lesson.



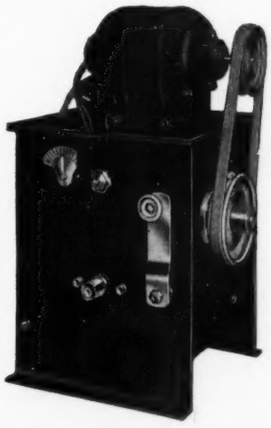
For your convenience a number has been assigned each item. Check the items in which you are interested on the coupon on page 67 and mail to us. Complete information will be forwarded.

● Indicates product not listed in 1935 Directory
△ Indicates product and manufacturer not listed in 1935 Directory

NEW PRODUCTS

144—Oilmotor Drive

The new Anchor Oilmotor Drive employs the powerful hydraulic principle, using a minimum of parts to rotate the worm which delivers the coal from the hopper to the fire. The heart of the drive is a high-pressure oil pump, producing an even flow of oil and developing 200 pounds cylinder pressure, which



delivers oil to a double-ended cylinder. This pump is located on the same shaft that drives the fan and is driven by the same motor through a V-belt and pulleys. The valve mechanism employs the same reversing principle which has been successfully used for so many years in the construction of steam pumps, etc. Anchor Stove & Range Co., New Albany, Ind.

◆

● 145—Attic Ventilation

A new propeller type fan designed specifically for night air cooling is announced by Autovent Fan and Blower Co., 1805 N. Kostner Ave., Chicago. The unit consists of a multi-blade fan connected by V-belt to the motor, with both fan and motor mounted in a frame so designed that installation can be made at an outside wall or within the attic space. For inside attic installation provision is made in the housing for joining the housing to a grille by a sheet-metal, canvas or pressed board connection. For wall mounting provision is made for connecting to an outside louver.

The fan is made in four sizes with capacities of 2200 to 9000 c.f.m. free air delivery. Motors are 1/5 to ½ H.P., 110 volt, 60 cycle, A.C. running at 1750 R.P.M. Literature giving all physical data and installation suggestions is available.

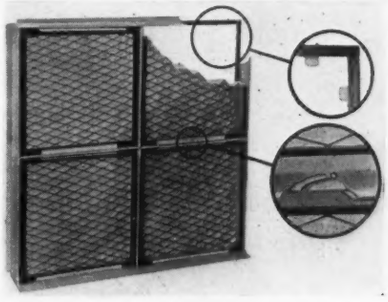
146—Air Conditioning Furnace

An air conditioning furnace, including an oil burner and a blower and filter unit, is announced by the Bryan Plumbing and Heating Company, Bryan, Ohio. The furnace consists of a one-piece welded iron firebox and radiators guaranteed dust-tight and gas-tight. The furnace housing is air-tight with quick-locking seams for easy assembly. It is furnished in seven sizes ranging from a heating capacity of 800 square inches of leader pipe to 250,000 Btu output with an oil burner range of from 1.5 gallons per hour consumption to 2.3 gallons per hour consumption; C.F.M. delivery from the fan is guaranteed at ⅛ inch static pressure from 1500 to 3000 C.F.M. Some of the units are furnished with water sprays for air washing and humidification. Special attention has been given to securing long flue travel, and resulting low stack temperatures. On the units provided with sprays the air is passed through the sprays first, then through scrubber plates and finally through the filters. This treatment is said to give exceptionally long life to the filters. The furnace can also be purchased without the fan-filter-washer unit.

◆

147—Filter Frame

A new air filter frame by the Owens-Illinois Glass Company, Newark, Ohio, increases "Dustop" efficiency by employing a felt strip between filter and frame against which the filter is tightly held by a simple wedge lock. This arrangement



provides a positive seal that prevents leakage of dirt-laden air at any point.

The square felt strip is inserted when the frame is constructed and is held permanently in place by bending the metal tabs over the frame flanges. The wedge lock is applied on the intake side of the frame to force the filter firmly against the felt "gasket." This device is easy to put on or remove and is self-adjusting to variations in thickness of the filters in the bank.

148—Knock Down Fittings

A new line of knock down smoke pipe fittings is announced by the A. G. Brauer Supply Co., St. Louis, Mo., distributors for the manufacturers—Ster-na-man Fittings, Springfield, Ill.

The fittings consist of four pieces—a center, end, cap and band piece which can be assembled to form a tee, angle or elbow without requiring any cutting or other pieces. The fittings are manufactured in 24-gauge galvanized iron in 8, 9 and 10 inch diameters.

◆

△149—Elbow Machine

A new elbow machine, known as Model C, is announced by Ingels Elbow Machine Corporation, 2634 Fullerton Avenue, Chicago, Illinois. The new machine is said to possess the following features: bronze worm gears; bronze bearings throughout; equipped with a two-speed motor; makes elbows 2 inches and up of

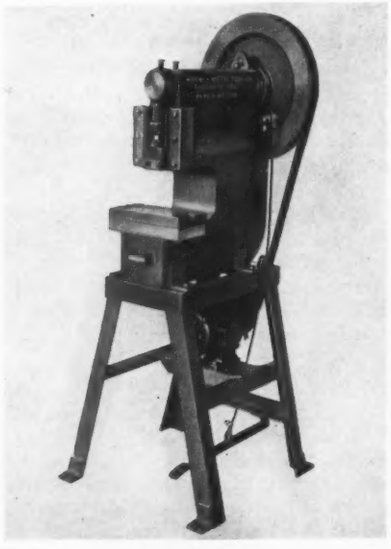
22 gauge and heavier stock; greater production capacitiy and the use of a three-to-one ratio gearing.

The manufacturer states that elbows can be made in less than two minutes. The cutting and beading are done in one revolution of the tube, the segments snap together instantaneously and in another revolution are joined. Reports reaching the manufacturer from users indicate that one man can make upwards of 1000 eight-inch elbows in 50 hours. The machine requires ten square feet of floor space and the elbows run full length at both ends.

New Products . . . . . .

150—Punch Press

Whitney Metal Tool Company, Rockford, Illinois, announce a new all-steel welded punch press. The machine comes equipped with a three-quarter horse power motor for either 110 or 220 volts and can be operated from an electric light socket if desired. The motor ratio is three to one and the stroke is 135 R.P.M. All parts of the press are stan-



darized and can be replaced. The machine is built of steel plates, welded box type design, with three station clutch pins in the fly wheel and an adjustable brake shoe on the main shaft. The fly wheel is at the rear of the machine out of the way. The machine can be furnished with an automatic stock feeding device if desired. Literature containing a full set of specifications has been prepared by the manufacturer and can be obtained by addressing the main office.

◆

△151—Velometer

The Boyle Velometer, offered by the Illinois Testing Laboratories, Incorporated, 420 North La Salle Street, Chicago, Illinois, is a direct reading air velocity meter which gives accurate and instantaneous readings of the speed and direction of air motion measured in feet per minute.

It is housed in an attractive black bakelite case 5¼" x 5¾" x 2⅜" in size and weighs approximately two pounds.

The air enters through a port or a jet and tube (depending on the style used) and leaves through a port on the right side of the meter. This air passing through the meter actuates a movement comprising a vane, control springs, pointer, and magnetic damping system.

A pointer locking button is provided to lock the pointer to retain the reading or when the instrument is not in use.

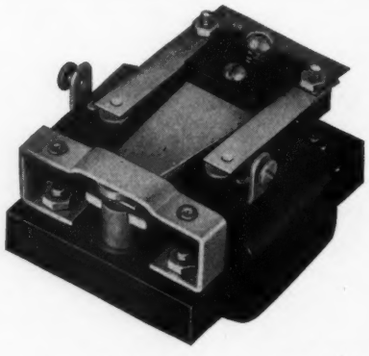
The Velometer is furnished in two types, each with a double range scale. The shutter type, is furnished with a shutter for opening or closing the port for changing the range and is not provided for tube attachment. In the tube type Velometer when used for the low range readings, the tube attachment is removed and the air enters directly through this port. For high range readings, tube attachment with a suitable jet is used. The air enters through this jet. As the tube is flexible the jet can be moved about as required with the instrument held stationary if desired. With the Tube Type Velometer, accurate velocity readings of the discharge or suction of grilles, ducts, or other restricted and small openings can be easily and quickly obtained.

The standard scale range is 0-300 and 0-3000 feet per minute, although other ranges are also offered. The low scale on either type provided accurate readings as low as 20 feet per minute.

◆

152—Relay Transformer

A low voltage transformer and a relay combined in a single unit to obtain substantial economies in space, cost, and operating characteristics, is announced by Russell Electric Co., 342 W. Huron St., Chicago. The complete unit occupies a space 3" x 3¼" x 2¼". All current carrying parts are insulated so that it may be attached direct to a metal case without insulating support. The device is rated at 15 amperes, 110 volts, A. C.,



and is available either as single pole double break or two pole single break. The large silver contacts have a wiping action in closing. The relay completes half of its travel before the circuit is opened so that an extremely quick break is secured. The current consumption of this device is less than is consumed by the two separate devices that it replaces. The unit may be purchased for assembly in conjunction with control equipment or it may be supplied completely hooked up with connection terminals in a relay box.

◆

153—Disc Fans

A new line of disc pressure fans and a new duplex rotation impeller-blower, is announced by the De Bothezat Corporation, 100 Sixth Avenue, New York City.

The selective series embodies three types of fans. The L-type is a low pressure fan having a high frequency at free delivery or high specific capacity. The HL and H types are high pressure fans having a high frequency for small values of specific capacity. The H type gives higher pressures and higher capacities than the HL type but the HL type has a lower power consumption. The L type fans are offered in sizes from 18-inch to 48-inch ranging from 1200 to 51,000 C.F.M. at one-eighth inch static pressure. The HL fans are offered in 18-inch to 48-inch diameter with capacities from 1400 to 32,000 at one-eighth inch static pressure. Both H and L type fans are also offered in the "Giant" size, with diameters from 5 inches to 10 inches and C.F.M. capacities from 5,000 to 356,000 C.F.M. at one-eighth inch static pressure.

The duplex rotation impeller-blower consists of two propeller type fans mounted within a single casing with direct connection to the motor in the rear. High air delivery at low R.P.M. and also high static pressure at a low R.P.M. are claimed by the manufacturers. The impeller is designed to fit directly into the duct, if necessary. One fan wheel is mounted on the motor field and the other on the motor armature revolving at 420 R.P.M., yet both operating at 150 R.P.M. in relation to each other. The manufacturer has divided this line of fans into four groups for very quiet, quiet, commercial and industrial types. These fans are offered in sizes from 8 inches to 10 feet in diameter with capacities from 700 to 300,000 C.F.M. at one-eighth inch static pressure.

◆

△154—Oil Boiler

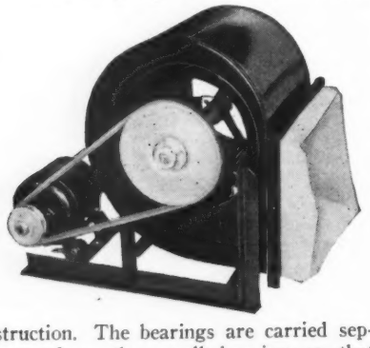
A new boiler, designed especially for the burning of oil, is announced by the International Heater Company, Utica, New York. The design of the boiler is entirely new, consisting of concentric circular sections with a circular firebox in the center and completely surrounded by the water section. The boiler is housed in a half-circular casing resulting in exceptionally low heights. The barrel-type

firebox is said to absorb heat reflected downward as well as heat reflected upward and to the sides. To take full advantage of this radiation, the water sections extend underneath the firebox. Fire travel is from front to back and reverse. The boiler sections are built of cast iron with pipe connecting headers. The jacket is heavily insulated. Full explanation of the unusual design is contained in leaflets prepared by the manufacturer.

New Products . . . . . .

155—Belted Blower

A new belted blower, with a special floating power motor, is announced by the Peerless Electric Company, Warren, Ohio. The motor is mounted on an oscillating rubber support and is equipped with flat leaf-spring compensating device to insure correct belt tension at all operating speeds. The unit is equipped with variable pitch pulley that uses bearings of a self-aligning rubber mounted con-



struction. The bearings are carried separate from the scroll housing so that there is no possibility of a drumming action. Provision has been made whereby the scroll can be rotated to give any position of discharge.

The blower unit and the floating power motor are offered in three sizes, 10⅝ x 10⅝ inch wheel, 12 x 12 and 15 x 15. All units are completely engineered and manufactured in the Peerless plant, permitting the use of a motor requiring a minimum of wattage. Capacities range from 1500 to 4500 C.F.M. Units are all double width, double inlet wheels and housing contains a special provision for fastening the canvas connection.

◆

156—Automatic Shutters

A line of automatic shutters for use with exhaust fans, designed to protect the fan when not operating and prevent entrance of rain or snow, is announced by the Elgo Shutter and Manufacturing Company, Detroit, Michigan. The shutter louvers are made of light gauge aluminum to provide a rustless and ice eliminating surface. Strips are machined into the leading edge of the louver. The shutters are balanced on bronze bearings and all shutters are connected to an aluminum tie rod which operates each section. The shutter frames are made of angle iron and band iron acetylene welded at the corners.

◆

157—Air Conditioner

A new air conditioner of the horizontal type, designed especially to meet the requirements of retail stores and restaurants or other places where head room is of special importance, is announced by York Ice Machinery Corporation, York, Pennsylvania. The unit may be used for both winter and summer air conditioning, cooling and dehumidifying in summer, heating and humidifying in winter, with twelve month circulation and filtering. The conditioner is designed to be located at some point exterior to the space conditioned and connected thereto by ducts. When located in the conditioned space the mechanical parts are enclosed in an attractive housing. Copper finned coils for cooling and heating, designed for use with a refrigerant, cold water or brine, and for steam or circulating hot water, are used in the unit. Air propulsion is by means of a multi-blade centrifugal blower. For winter humidification special bronze nozzles atomize water.

◆

158—Two Season Thermostats

Julien P. Friez & Sons, Inc., Baltimore, Maryland, announces an advanced range of Thermostats, designed specially for the requirements of modern air conditioning.

Sensitive to temperature changes as low as plus or minus ½° F., and with special features that entirely eliminate the possibility of chatter. These instruments have Summer-Winter manual switches built right into the instrument case, and already interwired so that all types of heating and cooling equipment can be operated off a single instrument during both summer and winter.

Changing the position of the Summer-Winter switch reverses the action of the electrical contacting within the instrument so that heating equipment is started on falling temperature in the winter whereas cooling equipment started on rising temperature in the summer.

News Items . . . . .

Promote Air Conditioning In Youngstown, Ohio

By Howard Sutton

Seven dealers, representing American Blower, Carrier, Frigidaire, G. E., Kelvinator, Westinghouse and York air conditioning manufacturers, united with the Ohio Edison Company in Youngstown, Ohio, to put on an Air Conditioning Exhibit in the auditorium of the power company.

We want to bring out that the use of air conditioning on a year 'round basis holds no mystery, nor is it too technical or even high priced to be beyond the comprehension of those people who view our exhibit.

In the center of the auditorium we have constructed a fountain, which carries a story of air conditioning for health, comfort, efficiency and profit. This story is placed on glass plates under water, with lighting beneath a false bottom of the tank. The copy on the glass stands out in an appealing manner as the fountain sprays water down over the rocks to ripple the surface of the water over the glass plates.

The story is further developed through the use of a short skit in which six characters appear, three of whom are villiains known as "High Temperature," "Humidity" and "Dust and Dirt." Their ability to work on a customer in a restaurant about 6:00 o'clock in the evening of a hot summer day is quite familiar to all of us. Needless to say that the air conditioning unit, which the restaurant manager obtains just in time to hold his customer, saved the day. This unit produces such a change in the customer that he orders a steak with all the trimmings, and not only one but three, as he leaves to telephone two of his friends to have dinner with him in a real place.

Easel type placards portray graphically the pertinent stories of the value of and need for air conditioning. We have attempted to make it impossible to leave the auditorium without being thoroughly air conditioning minded.

Perhaps the most important idea of our educational effort is to appeal to the mind of the individual who views a large bulletin board (note picture above), which explains how true air conditioning is accomplished by providing better air to breathe and controlling temperature, humidity, purity, circulation and ventilation within an enclosure.

In the upper right hand corner of this board there appears a picture of a room into which you look as of from the ceiling, thus showing the walls, furniture and two occupants. We explain

how air which conditions this room passes through ducts and is filtered, removing dust, dirt and pollen, and then passes over the cooling coil where it is cooled and dehumidified and is then circulated about in the room. An exhaust fan removes the smoke and odors from the room. The air is then re-circulated and outside air is added to compensate for the loss and complete the cycle.

In order that the heating cycle may be shown on the same board we have designed a method using two stereopticon lanterns focused on a mirrored plate glass, in order to save space, and hence transferred to a ground glass surface, which picture appears on the front of the board.

These pictures change every 30 seconds unless held for further explanation. Coincident with the change of picture on the ground glass from cooling to heating cycle there is a change of copy from condensing unit to boiler and a change of color of the arrows in the duct from green to red, indicating the temperature of the air within.

News Items . . . . .

Air Conditioning Show in New York

An air conditioning exposition is announced for New York City, June 10 to 15, in the Port of New York Authority Building.

◆

Changes Name to Republic Metal and Roofing Materials, Inc.

The Chicago concern previously known as "Republic Metals, Inc." announces a change in name to "Republic Metals and Roofing Materials, Inc." According to Sales Manager, W. Joy, the change in name is due to the fact that the organization is now acting as jobber for roofing materials. This gives the organization a coverage in the furnace, roofing and sheet metal trades.

◆

Clean Air Electrically

Development of an electrical unit to remove dust, soot, pollen or other solid and liquid particles in air has progressed to the point where engineers of the Westinghouse Electric & Manufacturing Company now have several experimental models installed in homes and offices of the Pittsburgh district.

Electrically the unit is a comparatively simple device. It is so arranged that it draws particle-filled air past two small wires, suspended horizontally. Connected to a power pack, which raises their voltage, these wires "charge" all air particles in their vicinity. This act is termed ionizing the air. Next the ionized particles are drawn through a series of plates which are also charged. The plates have opposite polarity, with the result that just as a needle jumps over to a magnet, so do these air particles move and cling to the plate. Thus the air is made to clean itself.

In addition, a film of oil covers each plate to make certain that the particles after being attracted, stick to the plates.

The air, freed of particles, is then sent on into the room by means of a fan. The unit only requires about 50 watts to operate, the same amount of current consumed by an ordinary electric lamp.

After the aluminum plates fill up, they may be cleaned by simply running water over them.

◆

Announce Date For Ohio Convention

The Ohio Sheet Metal and Roofing Contractor's Association announces that the 1934 annual convention will be held during the first week in August in Toledo, Ohio. The exact dates will be announced shortly. Plans are being made for a convention equally as good as that of 1930. A program of interesting and usable addresses, with entertainment is being prepared. For immediate information write Joe Dersher, 40 Eleventh St., Toledo, chairman of the convention program.

◆

Semi-Annual A.S.H. & V.E. Meeting

The 1935 semi-annual meeting of the A.S.H. & V.E. will be held in Toronto, Ontario, Canada, June 17, 18, 19, at the Royal York Hotel. In addition to a comprehensive program of papers, golf, bridge, a banquet, luncheons, and sight seeing have been arranged for.

◆

Inland Steel First Vice President Dies

Edward Martin Adams, 58, first vice president in charge of sales and a director of Inland Steel Company, died at St. Joseph's Hospital, Hot Springs, Ark., on May 8.

Mr. Adams had gone to Hot Springs for a vacation late in March. He was stricken while there on April 24 with a heart attack to which he succumbed two weeks later.

He was born at Cherry Valley, Ill., on December 1, 1876. As a young man he was in the employ of the Illinois Central Railroad and served a term as Mayor of the City of Harvey, Ill.

On June 17, 1907, he entered the employ of the Inland Steel Company as Secretary of the company in charge of the credit department and was also active in a sales capacity. In 1918 he was elected a director of the company and in 1921 became vice president, also retaining the office of secretary. On January 31, 1922 he was elected first vice president and general manager of sales, which position he has held since that time.

New Literature . . . .

For your convenience in obtaining copies of New Literature, use the coupon on page 67.

258—Time-Switch Leaflets

Sangamo Electric Company, Springfield, Illinois, has made available for contractors interested in night air cooling a series of leaflets fully describing the company's line of time switches which may be used to start and stop attic ventilating fans. The first leaflet describes the time switch especially adaptable for night fan cooling. This switch has silver mechanical contacts rated at forty amperes. The 24-hour dial is supplied with three pairs of operating levers allowing for either one, two or three "on" and "off" periods each day. The minimum time period between the "on" and "off" operations is thirty minutes and between the "off" and "on" two and one-half hours. The instrument can be obtained for 60, 50, 30 or 25 cycles and 115 or 220 volts.

The second leaflet describes Model B time switch, which contains an electrically wound movement with jeweled balance, with all mechanism contained in a dust-proof case and providing automatic or manual operation. The standard switch has levers for three complete daily operations with the same minimum "off" and "on" requirements as described previously. Another leaflet describes the outdoor time switch with its special water-proof case.

◆

259—Furnace Pipe and Fittings Leaflet

Acer and Whedon, Inc., Medina, New York, announce a new catalog covering their line of tin pipe, elbows, boots, register boxes and galvanized iron pipe. The leaflet shows the various types of fittings manufactured by the company and contains a complete price list for all fittings in all sizes manufactured by the company.

◆

260—Stainless Steel in the Textile Industry

A new folder, issued by Republic Steel Corporation, Massillon, Ohio, explains the advantages of Enduro stainless steel for textile equipment. An interesting feature of the folder is a series of actual color illustrations of yarn samples dyed in acid colors and in acid chrome colors, showing how stainless steel holds the true color of the dye without the slightest change. The text explains how the characteristics of stainless steel prevent corrosion or chemical reaction in the solutions contained in vats. Attention is called to the fact that the stainless steel vats never need replacement whereas the common type of wood vat frequently needs boiling out and replacement. A number of examples wherein stainless steel satisfactorily meets the specific problems connected with various activities in the dying business are covered in detail.

◆

261—Leaflet on Niteair Cooling

Lau Heating Service, Inc., 3116 North Main Street, Dayton, Ohio, announce a new mimeographed bulletin covering the Lau Niteair fan. Full explanation of the principles of night air cooling are presented in the pages of this leaflet. The text is so written that the home owner or prospect can understand the advantages of night air cooling by reading the various sections. Illustrations show various methods of using the attic fan for ventilating first and second floor rooms. Explanation is made of how a fan placed in the attic may draw air through first or second floor windows and clean out hot daytime air and replace it with cooler outside air. One section of the leaflet is devoted to the use of Niteair fans for top floors of apartment buildings.

The leaflet explains in detail the proper methods of operation, giving the hours during which the fan should run, the proper method for opening and closing windows, the number of air changes required as established by University of Illinois tests and suggests one or two methods for automatic control. A number of interesting paragraphs cover the savings effected by insulation and also the operating costs of the Lau fans and blowers. One sheet is devoted to specifications of the new Niteair fan.

New Literature . . . .

For your convenience in obtaining copies of New Literature, use the coupon on page 67.

262—Night Air Cooling Leaflet

Peerless Electric Co., Warren, Ohio, announces a new leaflet giving full information on construction, operation, prices and full physical data on their new attic ventilating fan. Information is supplied on the fan and its characteristics, also on the special housing provided with suggestions on installation.

◆

263—Knock Down Fittings Leaflet

A leaflet showing and describing the Ster-na-man "knock down" fitting for smoke pipes has been prepared by the A. G. Brauer Supply Co., St. Louis, Mo., distributor for the manufacturer. The leaflet shows the four pieces which, without cutting or use of other pieces, can be assembled to form a tee, angle or elbow. The leaflet gives full information with sizes and prices.

◆

264—Firepot Lining Leaflets

A four-page colored leaflet, describing the characteristics of the Fireline refractory cement and the results obtained with the usual firepot when lined as compared with an unlined pot and containing full information on the proper method of application for this material, is announced by the Fireline Stove & Furnace Lining Company, Chicago, Illinois. Illustrations show the proper method for applying Fireline refractory. Text explains the results obtained in maintaining even hot fires with lined and unlined pots as well as interesting information on the proper methods of patching firepots by the use of cement. The leaflet also contains information on window cards, circulars, counter displays and maps made available by the company for the use of the contractor. Prices of the material and methods for securing these mail helps are explained in detail in the leaflet.

◆

265—Apollo Metal Leaflet

An interesting form of leaflet, describing various uses of Apollo metals, shows such unusual applications of these special metals as stove handles, ash trays, mirrors and some special fittings. The text accompanying the illustrations emphasizes some of the special characteristics of this metal which make it specially suitable to work of this kind. Apollo Co., La Salle, Ill.

◆

266—Dealer Helps Cleaning Stuffer

A mailing stuffer or hand bill, designed as a dealer help in securing furnace cleaning jobs is announced by Peerless Foundry Co., Indianapolis, Ind. The subject is—Now Save ⅓ Of Your Coal Bills. The stuffer presents seven reasons for having the heating plant cleaned. Among the reasons are—fuel saving, less firing effort, house cleanliness. Emphasis is also laid on getting needed repairs done while the cleaning is under way. Requests for samples or quantities will be filled promptly.

◆

267—Night Air Cooling Folder

Russell Electric Company, 342 West Huron Street, Chicago, Illinois, announce a new folder covering night air cooling. In addition to a general description of the fan recommended for night air cooling, a brief discussion of the principles of night air cooling are presented for contractors. This basic information explains why night air cooling is a means of reducing night air temperature, explains the method of operation, gives quoted information on the number of air changes per hour required to do night air cooling and presents a discussion of the subject of attic window cross ventilation and attic ventilation. A brief summary of an ideal night air cooling installation covers the three points required for good operation. Some of the particular problems of night air cooling; such as the problem of noise, the advantage of using awnings and insulation and an interesting reference to published material covering night air cooling, are presented. The last page of the leaflet explains how to install the Russell Electric Company's night air cooling fan.

New Literature . . . .

For your convenience in obtaining copies of New Literature, use the coupon on page 67.

268—Furnace-Air Conditioner Leaflet

The Joliet Heating Corporation, Joliet, Illinois, announce a new color leaflet, describing their Comfortmaker, constant-air-flo and 6-stage air conditioner. This unit consists of a steel furnace, properly constructed for automatic firing, and a housed-in blower and filter section. All apparatus is contained within a single square housing. Illustrations show the design, with arrows pointing to the features of particular importance. The leaflet is satisfactory for customer distribution in that it explains the full operation of this type of heating and air conditioning apparatus. The six stages covered by the unit are: 1—heating; 2—air circulation; 3—humidity; 4—cleaning; 5—control; 6—increased circulation for summer cooling.

◆

269—Control Leaflet

A four-page leaflet, describing a waterstat, immersion and strap-on types, with furnace switch and pressure switch, flame control and constant level valve, and listed as Bulletin No. 120, is announced by United Electric Controls Company, 69 "A" Street, Boston, Mass. The photographs show illustrations of the various pieces of apparatus and give full information on operating characteristics and general description of the materials used in the instrument. Each instrument has a set of standard specifications.

◆

270—Furnace Pipe Catalog

The Excelsior Steel Furnace Company, 114 South Clinton Street, Chicago, Illinois, announce a new furnace pipe catalog showing the galvanized ducts and fittings pre-fabricated and ready for erection. The company has been manufacturing a line of pre-fabricated rectangular duct fittings for some time and is one of the pioneer manufacturers of this type of pipe and fittings.

◆

271—Cooling and Air Conditioning Booklet

Bulletin No. 2967, recently issued by Buffalo Forge Company, Buffalo, New York, includes a complete showing and listing of the company's various types of cooling units. Among the many units illustrated and explained are the suspended unit coolers, floor type unit coolers, flat suspended unit coolers, floor units using brine sprays, central system conditioning cabinets. Illustrations show full details of each particular piece of apparatus and complete ratings and dimension tables are included. Additional information on the refrigerant used, proper method of application, and particular places where each unit is suitable, is furnished in the text.

◆

272—Floor Plate Leaflet

A 6-page letter size folder announcing a new pattern of Inland 4-Way Floor Plate and describing the two patterns already made has just been published by the Inland Steel Company, Chicago. The new Light Pattern 4-Way Floor Plate is recommended for use where light weight is a factor, meeting the requirements for such applications as truck running boards and cab floors.

◆

273—Attic Fan Catalog

Paul R. Jordan & Company, 631 South Delaware Street, Indianapolis, Indiana, announce a new catalog No. 12K covering the company's recently announced attic fan. Illustrations give full information on dimensions for roughing-in the fan. There are also tables of capacities and the necssary price list. Sketches show recommended methods of using the night air fan for exhausting directly through ceiling registers and setting up a pressure in the attic; for exhausting through ceiling registers and exhausting directly to the outdoors; and for a system wherein the ceiling registers are connected to the fan housing by means of short ducts. Text matter explains how to figure the cooling requirements for an apartment or residence, gives reasons for night air cooling, covers the subject of insulation, and the possible cooling effect to be obtained with the company's various sizes of fans.

New Literature . . . .

For your convenience in obtaining copies of New Literature, use the coupon on page 67.

274—Direct Coolers and Fans

The Trane Company, LaCrosse, Wisconsin, announces two new leaflets. The first leaflet, A.I.A. File No. 30-d-1, covers Trane fans for heating, ventilating, drying and air conditioning. By means of illustrations and detail text each particular type of fan is shown and explained completely. Structural specification tables, with roughing-in dimensions and capacities are presented in tabular form. The capacity tables are unusually complete covering a range of delivery from 600 to 22,000 C.F.M., and from one-eighth to five-eighths inches of static pressure. Operating characteristics of the various types of Trane fans are given in chart form. The leaflet also contains some usable tables, such as circular equivalents of rectangular ducts for equal friction and C.F.M. through round pipes.

The second leaflet covers the Trane direct cooler, which consists of a cabinet containing necessary coils and fans and suitable for mounting by suspension from the ceiling or placing upon the floor or some suitable platform.

◆

275—Control Bulletins

Two new bulletins "K" and "G" are announced by Julien P. Friez & Sons, Inc., Baltimore, Maryland. Bulletin "K" is a condensed catalog and briefly lists a number of new items. It calls particular attention to the new summer and winter thermostats designed especially for modern air conditioning requirements.

Bulletin "G" covers the new moderately priced portable recording instrument for relative humidity, temperature, etc. Illustrations and full explanation of each particular piece of apparatus, together with price lists, are presented on the pages of the leaflets.

◆

276—Galvanized Sheet Metal Specifications

American Rolling Mill Company, Middletown, Ohio, announces AIA File No. 12-C3 folder covering suggested specifications for sheet metal products where galvanized iron is to be used.

The specifications cover general introduction, general workmanship, metal roofing, gutters, conductor pipe, elbows, etc.; valleys, hips, ridges, flashings, skylights and scuttles. There is also some additional information relating to galvanized iron as a roofing material.

◆

277—Delivered Price Quotation Sheet

Milcor Steel Company, Milwaukee, Wisconsin, announce a new business reply envelope quotation sheet being used by all the company's branch offices. The quotation sheet shows delivered prices to your city or the nearest railroad station. The sheet also contains an order blank which may be filled in by the contractor when ordering supplies. As received by the contractor, several common types of roofing and siding materials are listed by delivered price for gages from 29 to 26. With these prices before him the contractor may order the quantities required for a particular job or stock.

FOR YOUR CONVENIENCE
American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Check numbers in which you are interested):

144	145	146	147	148	159	150
151	152	153	154	155	156	157
158						
258	259	260	261	262	263	264
265	266	267	268	269	270	271
272	273	274	275	276	277	

Name..... Title.....
Company .....
Address .....

With the Manufacturers . .

Owens-Illinois Division Concentrated in Newark

Completing the concentration of its Industrial Materials Division in Newark, Ohio, the Owens-Illinois Glass Company, Toledo, has recently moved the sales department of this division from Toledo to the Newark plant. Research and engineering as well as production are now carried on at the Newark plant.

Garland Lufkin, formerly manager of the Owens-Illinois factory at Bridgeton, N. J., is now in charge of the entire operation of the Industrial Materials Division. J. S. Irvine continues as sales manager.

◆

Revised Gas Burner Price List

Barber Gas Burner Company, 3702 Superior Avenue, Cleveland, Ohio, announce a revised price list which, with the necessary discounts, is said to be lower than at any time since 1927. The price list covers the company's line of slotted cap jet burners, bell baffle jet burners, mushroom cap jet burners, impinged jet burners, all with safety control. Prices are also quoted for these various types of burners without safety control. Additional prices are included for the patented gas burner jets and for the Barber gas pressure regulators.

◆

Maplewood Machinery Co. Opens Downtown Chicago Office

Maplewood Machinery Company, with a plant at 2638 Fullerton Avenue, Chicago, has recently opened a new downtown sales store at 561 West Washington Boulevard. According to J. J. Ingels, president of the company, this move is in line with the company's aim to give local customers the best possible service. The company will use the entire building at the new address and will carry a complete stock of machinery and supplies. Mr. Ingels reports that so far as the company is concerned there has never been a period of poor business. Orders have been small but have been numerous.

◆

Paul G. Davis Appointed Cheney Mid-West Manager

Announcement is made by the Cheney Company, Winchester, Massachusetts, of the appointment of Paul G. Davis as manager of the mid-western territory. Mr. Davis has been representative-at-large for the Cheney Company, establishing contacts with architects, engineers and others interested in weather protection. Mr. Davis' headquarters will be at 2200 North Natchez Avenue, Chicago, and his work will consist primarily of promoting weather protection with architect and engineers.

◆

Gardiner Appoints Western Sales Agency

The Gardiner Metal Company, Chicago, Illinois, announces the appointment of Morris P. Kirk and Son, Inc., 2717 Indiana St., Los Angeles, California, as direct factory representatives for the former's complete line of flux-filled solders. The Los Angeles concern will handle the distribution of the Gardiner product in Arizona and southern California and will maintain a complete warehouse stock to facilitate prompt shipments.

◆

Brown—Minneapolis-Honeywell Open Atlanta Office

The Brown Instrument Company, Philadelphia, Pa., manufacturers of instruments and controls, and the Minneapolis-Honeywell Regulator Company, Minneapolis, Minn., manufacturers of control systems and regulators, have opened a joint office at Room 303—the 101 Marietta Street Building, Atlanta, Georgia, to serve the Southeast.

Wesley R. Moore, for a number of years District Manager of Brown Instrument Company, is manager in charge, with Leon L. Kuempel, Sales Engineer, Charles A. Kitzinger, Service Engineer, and J. A. Crawley, Office Manager.

◆

Faultless Appoints E. J. Connor

The Faultless Heater Corporation, of Cleveland, Ohio, announces the appointment of E. J. (Ed) Connor, to represent them in New York State and Eastern Pennsylvania. Mr. Connor, who was formerly associated with the Graff Furnace Company, predecessor of the Faultless Heater Corporation, has had a great many years experience in the heating field, and is well known to the trade in the territory in which he will travel. Mr. Connor's headquarters will be in Olean, N. Y.

With the Manufacturers . .

E. L. Ryerson Becomes Insurance Director

Edward L. Ryerson, Jr., President of Joseph T. Ryerson & Son, Inc., steel-service organization, was recently elected to the board of directors of the New York Life Insurance Company. Mr. Ryerson succeeds Alba B. Johnson of Philadelphia who died recently.

◆

Republic Steel Appoints Lee Wright

Lee Wright has been appointed sales representative for Republic Steel Corporation, with headquarters at 401 Atlas Bldg., Salt Lake City, Utah.

Prior to his connection with Republic, Mr. Wright had been associated with Zion's Co-operative Mercantile Institution, Salt Lake City, since 1902.

◆

William Goodman Joins Trane

William Goodman, formerly consulting engineer of Chicago, has joined the engineering staff of The Trane Company, air conditioning manufacturers, of La Crosse, Wisconsin.

Mr. Goodman designed mechanical equipment which included heating, ventilating, and air conditioning, for many of the large buildings in Chicago. He was formerly associated with the Paramount Theatres Corporation in connection with air conditioning work and more recently with Warner Bros. Theatres Corporation in charge of design, maintenance, and operation of air conditioning, heating, and ventilating equipment in their numerous theatres throughout the United States.

◆

Revere Copper and Brass Moves Office

Revere Copper and Brass, Inc., announces the removal of its Pittsburgh office to Room 1028 Gulf Building, Pittsburgh, Pennsylvania. J. F. Croasdale will be manager and B. N. Huntington assistant.

◆

Excelsior Furnace Announcement

The Excelsior Steel Furnace Co., Chicago announces that—due to the decision of the Supreme Court all restrictions and regulations of the various codes under which we have been operating for nearly two years have been removed enabling us to return to the efficient methods of conducting our business which proved successful for more than half a century.

It has cost us more than twenty thousand dollars to comply with the various codes under which we have been compelled to operate during the past two years and in return we have received not one penny of benefit.

◆

Dail Appoints J. G. Stalb

Dail Steel Products Co., Lansing, Mich., announces the appointment of Joseph G. Stalb, as eastern district sales director, covering the territory from Washington north, including the entire eastern Atlantic seaboard, including Pennsylvania and eastern New York. Mr. Stalb will have entire charge of complete promotion of the sales of Dailaire heating, cooling, and air conditioning equipment in that territory. Mr. Stalb will have a complete organization to cooperate with architects, engineers, and dealers in that district, and will be permanently located at 155 East 44th Street, New York City.

◆

Dr. John Chipman Joins Armco

Dr. John Chipman has joined the research staff of The American Rolling Mill Company as Associate Director of the Research Laboratories. He will be responsible for research activities in the field of melting and refining metals. For six years he was research engineer in the Department of Engineering Research at the University of Michigan. Dr. Chipman was the recipient of the Howe Medal of the American Society for Metals in 1934, being awarded this distinction for his paper on "The Application of Thermodynamics to the Deoxidation of Liquid Steel."

◆

Will-Burt Opens Cleveland Office

The Will-Burt Company of Orrville, Ohio, manufacturers of domestic and commercial stokers, announce the opening of a district office at 4500 Euclid Avenue, Cleveland, under the direction of Charles H. Fillmore, Jr. Mr. Fillmore spent a number of years in the sales department of American Radiator Company and its subsidiaries.

Fayette Furnace Co. Sales Program

(Continued from page 17)

Our furnace cleaning machine is also one of our sources of obtaining prospects. We do not plan to make any money through cleaning furnaces. It is only another method of getting into basements and learning which homes are prospects for new furnaces. If, when cleaning a furnace we find a cracked firepot or combustion chamber or radiator, and can point these out to the home owner and follow this up with a good selling job, it has been our experience that we can sell a new heating system without competition.

F. H. A. Cooperation

Of course, the biggest help which we have received in the last couple of years is the financing plan inaugurated in connection with the Federal Housing Administration. For dealers who are not familiar with this Act, let me state that the home owner who meets the simple requirements laid down by the Government can purchase a new heating system without any down payment; with monthly payments as low as $10; with 1 to 3 years to pay for the system; at a financing charge of $5 per year for each $100 financed. These are the most reasonable financing terms in history. Because these loans are Government insured, dealers take no financial responsibility and receive their full contract price promptly without any hold-back.

It so happens that we handle all our transactions through the financing affiliate of our source of furnace supply. I personally believe that this is advantageous to us inasmuch as we take the Property Owner's Credit Statement, with us and have it signed right in the privacy of the prospect's home.

Our experience explains why we are so enthusiastic about FHA financing, which we have featured in our newspaper advertising and which we broadcast through window posters. From September 1, 1934, approximately, when the Federal Housing Administration was announced, up until December 1, 1934, we sold 45 furnaces under the provisions of this Act. This is an average of a furnace every other day. During the same period we sold 30 additional furnaces for cash. Of these latter 30 sales, many were attracted by FHA financing, and we probably would never have heard of them had we not been advertising these favorable financing terms. When it came time to close these deals, they decided to pay cash.

I cannot emphasize too strongly the point that furnaces must be sold! We believe firmly in this fundamental—that people part with their money only for the things which they want very much. If we make them want a furnace more than they want a new automobile, a new refrigerator or new furnishings for the home, then we make the sale. If the automobile or other salesman does a better job than we do, then we are out of the running for a year or more until the automobile, refrigerator or whatever the article may be is paid for.

Projection of Air from Registers

(Continued from page 20)

sults secured on one job with those on another, but that to fill in gaps in the accumulated data, I could (and did) make a very simple set up back in the warehouse which enabled me to measure the distance that the current of air would carry from a duct outlet at various initial velocities and various duct diameters.

I found that after discarding a few tests which showed extremely eratic results, fairly smooth curves could be plotted to show the resultant velocity at various distances from the outlet and at various outlet sizes and initial air velocities.

If we assume that the 12 by 14-inch register as described in Konzo's article would be about the same as a 12-inch diameter round outlet my test results check very well with the data given on page 33 of your May issue, except that Professor Tuve's tests show the jet effect for a greater distance from the outlet which is perhaps due to his more elaborate testing methods. All I had available for this test was an anemometer which, however, was calibrated from time to time and the correction curve always used in determining the probable actual velocity.

Taking Professor Tuve's test with an initial velocity of 1000 feet per minute, he shows a velocity of approximately 600 F.P.M., five feet from the register, whereas I got 680 feet average velocity, five feet from the outlet. Ten feet from the outlet he shows about 430 F.P.M., whereas I got 490 F.P.M. average. Twenty feet from the outlet he shows about 270 F.P.M. in comparison with my 260 F.P.M., but at 30 feet he shows very nearly 200 F.P.M., whereas I got practically nothing at that distance.

I am citing these comparisons to indicate that my tests check fairly well with his for a 12-inch outlet. In the accompanying tabulation, note that 10 feet from the outlet where I show a velocity of 490 feet per minute for a 12-inch diameter outlet I show only 360 F.P.M., for an 8-inch outlet—580 F.P.M. for a 16-inch outlet and 740 F.P.M. for a 30-inch outlet. Initial velocity in each case 1000 F.P.M.

I have plotted these velocities on the accompanying cross section sheet for an initial velocity of 1000 F.P.M. and for 13 different size outlets and they indicate that there is a definite relation between the size of the outlet and the velocity of the air current at a given distance from the outlet.

A couple of years ago, I compiled a table of these various velocities. The table shows clearly the fact that the size of the outlet as well as the initial velocity affects the distance that the air stream will travel into the room.

Some furnace men may not agree with my conclusions, but some comment may bring forth somebody else's data and we would all benefit by it.

Warm Air Meeting

(Continued from page 26)

the summer cooling program hinged on whether or not the association subscribed a sufficient amount of money to inaugurate a program of tests on cooling by means of water. Mr. Sedgwick also outlined some of the progress made in recent research tests and compared present-day knowledge with old rules-of-thumb in which an 8-inch pipe would heat any room; when undersized furnaces were the rule rather than an exception; every installer had his own methods of design.

Casting Temperatures

Professor A. P. Kratz presented a discussion of temperatures of castings in common types of furnaces under ordinary firing conditions. Professor Kratz pointed out that the Research Staff has selected the grate area rather than the diameter of the firepot as the governing factor in combustion inasmuch as the square inches of grate area determine the amount of air which passes through the fuel bed. He explained how the highest temperatures under ordinary hard fuel firing occur within two inches of the grate area with decreasing temperatures from this 2-inch level on up to the top of the combustion chamber. He also explained how temperatures of castings are not equal to the temperatures within the firepot and combustion chamber. Research tests indicate the highest temperatures of castings to be approximately 1100 degrees or considerably below the melting point of iron.

Oil Burning

S. Konzo, Special Research Associate, presented a resume of last winter's research on oil burning equipment. Mr. Konzo said investigations disclosed that the breathing line-ceiling-floor temperature gradients are approximately the same with hard fuel as with oil if the same control system is applied to both installations. He indicated that the control system in which the room thermostat working through a relay controls both the fire and the fan with suitable limit controls to prevent the fan from running when bonnet temperatures are too low and operating the fan without opening the draft when bonnet temperatures are sufficiently high had also proved to be the best control system for oil firing.

An enlightening discussion related to manufacturers' ratings of oil burning furnaces. Mr. Konzo showed by charts that any particular furnace can show increased Btu output in direct proportion to increases in oil consumption. Tests at the Research Residence indicated that with oil firing drafts of the order of .002 to .004 inches of water are most satisfactory for steady burning, but that due to the fact that increased combustion must be had during warming up periods higher drafts than .004 are required.

The tests also indicated that an automatic draft damper of some type is a necessity. One interesting test showed that an automatic draft damper increased fuel cost approximately 10 per cent due to the fact that the automatic draft damper admitted warm basement air to the flue with the result that the infiltering air into the basement had to be warmed up at an increased cost of fuel consumption. Tests conducted using outside air intakes to the automatic draft damper resulted in an approximate saving of 5 per cent.

Some tests on the savings to be effected by reducing temperatures at night were conducted with interesting results. Mr. Konzo pointed

out that the theoretical saving calculation, as outlined in the A.S.H. & V.E. Guide, is not obtained under actual practice due to the fact that the theoretical calculation presumes that inside temperatures will drop from the daytime setting to the night-time setting immediately whereas under actual tests it required approximately three and one-half hours for the inside temperature to drop from 72 to 60 degrees. Under automatic firing the night temperatures were maintained at 60 degrees for several hours, but approximately four and one-half hours were required to bring inside temperatures up from 60 degrees up to the daytime setting of 72 degrees. This changes the theoretical calculating curve considerably and, furthermore, reduces the savings to be secured. Savings by reducing night temperature to 60 degrees are of the approximate order of 9 per cent.

In connection with this fuel saving by reducing inside temperatures, Mr. Konzo said tests indicate that even with severe outside conditions the inside temperature of the Research Residence did not drop below 60 degrees before the time when the automatic firing device came on for the morning warming up period. As a result of this, there is no actual saving to be gained by reducing night temperatures below a 60-degree setting.

Duct Heat Loss

In connection with temperature drop in ducts, tests at the Research Residence indicated that a fair correction factor of .6 degrees per running foot of duct will provide the contractor with an allowance which will compensate for temperature drop. A chart has been prepared on which the standard formula for C.F.M. can be corrected by applying the necessary factor to compensate for temperature drop. Another way of explaining this would be for the designer to take the number of feet of ducts, multiply it by the .6 degree temperature drop per foot and subtract this from the designed register air temperature and use this lower temperature in working out his C.F.M. formula.

The entertainment part of the mid-year program consisted of a golf tournament on the last afternoon. Several prizes were offered by members of the association. On the evening of the first day those attending were tendered a German supper with plenty of beer and a German band by the Lamneck Products Company.

◆

Restaurant Ventilating

(Continued from page 15)

The second coil, or reheater, is controlled by a modulating valve, with a controlling thermostat located in the restaurant. A third thermostat, cross connected to the above control, is placed in the fan discharge duct and functions as a limit control to prevent the temperature of air from fan dropping below 65°. A manually operated louvred bypass is provided under the coils. Adjustable directional air flow type outlets are furnished for all supply outlets in the walls.

This installation was designed and installed by the Charles Hartmann Company, 971-991 Dean Street, Brooklyn, New York.

LETTERS from OUR READERS

American Artisan:

A few days ago three copies of your magazine were loaned to me. In looking over the December issue I want to take a pot shot at A. Meder for the remark he makes about your magazine.

I dare say, in this town, you will not find one plumber or heating man (so called) in forty that could tell you how much heat would be given up by a pound of ice in melting from 32 degrees to water at 32 degrees, or how much heat it would take to raise the temperature of 1 gallon of water from 32 degrees to 212 degrees if they had to be shot at sunrise. As far as getting air conditioning knowledge under their scalps, the majority are hopeless. You try to tell them something that would be of value to them and they will stand with their mouths open and ask if you cannot make it more complicated. I find this condition much the same all over. The trouble lies with Mr. Meder and not with the information given in AMERICAN ARTISAN's pages. There is not a magazine published where the results of tests are made more simple and understandable than are found in AMERICAN ARTISAN.

Evidently, Mr. Meder is groping at the foot of the lighthouse with his eyes fixed on the ground, while if he would look up he would see light. He may look through colored glasses for a time, but if he will apply himself he would soon find he could put the glasses away.

When I first started the study of heating, ventilating and air conditioning I was about as dumb as they come. I scarcely knew the difference between a B.t.u. and a cooty. I read and studied everything I could get hold of on the subject and now after several years of experience and observation I feel I know the difference between these two, although I have never seen either.

So you see, Mr. Meder, there is hope for you yet, if you go at it in the right way.

F. W. Skinner,
Arlington, N. J.

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. One inch $3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date. Display rates for this page will be furnished on request.

SITUATIONS WANTED

JOBBER SALESMAN: WITH YEARS OF experience in sheet metal jobbing. 35 years old. Capable. Best references. More information to interested. Address Key 320, "American Artisan," 6 North Michigan Avenue, Chicago.

SITUATIONS OPEN

SALESMEN WANTED to handle warm air specialty in connection with their regular work. An item that offers large volume and good profit. Write now for further information. Address Key 321, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

FOR SALE

VARIOUS MAKES USED FURNACE AND boiler vacuum cleaners, with accessories. Good condition. We also manufacture the Baker. Write for prices and complete information. The Baker Furnace & Cleaner Mfg. Co., 2507 Albion St., Toledo, Ohio.

FOR SALE: ONE 8-FOOT 18-GAUGE Chicago Steel Brake, $75.00; 1 Bench, 3' 6" x 24' 0" x 3" thick, $35.00; 4 Burring Machines at $4.00 ea. 1 square Shear, 30", $15.00; 1 Whitney Punch, $5.00. Address Globe Sheet Metal Works, 907 S. Jackson St., Janesville, Wis.

FOR SALE: PLUMBING, HEATING, REpair and Tin Shop. Only shop in small town with large country territory. Death of owner is reason for selling. Address Ida Freeto, Mechanicsburg, Illinois.

SPRAY NOZZLES: RAINBOW MIST Spray Nozzles for washed air units, foolproof, no dirt clogging, breaks water to the finest misty spray possible—61 cents each. Lots 100 or more, 54 cents each. Dealers wanted. We manufacture washers and blowers. Two used blowers on hand now. Peterson Freezem Sales Company, 2620 Charlotte, Kansas City, Mo.

FOR SALE

Sheet Metal Machines
New and *Really Rebuilt*

A machine for every use and every machine is ready for use. The largest stock in Chicago. Ask for list.

Complete supplies and tools.

MAPLEWOOD MACHINERY CO., Inc.
Chicago
2634 W. Fullerton Ave. Brunswick 9200
561 W. Washington Blvd. State 1405

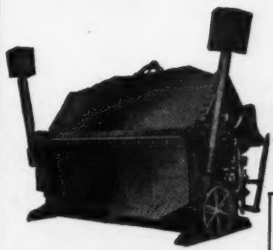
FOR LEASE OR SALE TO CLOSE ESstate: A complete set of roofing and sheet metal equipment and building, ready to operate. Located at Hastings, Nebraska, within 25 miles of flood area. A wonderful opportunity for the right party. Write the First Trust Company, Lincoln, Nebraska.

FOR SALE

? ? ? ? ? ?
HAVE YOU A SHEET METAL PROBLEM: FORMING—BENDING—PUNCHING—SHEARING
WE HAVE A MACHINE FOR EACH OPERATION ON SHEET METAL
Your Inquiries Earnestly Solicited
WARD MACHINERY CO.
SPECIALISTS
MACHINES — TOOLS — SUPPLIES FOR SHEET METALS
562 W. Washington Boulevard
CHICAGO, ILLINOIS

Patents and Trade Marks
Philip V. W. Peck
Barrister Bldg., Washington, D. C.

YOU CAN BENEFIT BY BUYING EFFICIENT
Sheet Metal Machinery at INTERSTATE



"A MACHINE FOR EVERY PURSE AND PURPOSE"

SOME REBUILT BARGAINS

Brakes, Chgo. St. Hand, 10'16; 10'14; 10'18; 8'14; 6'16; 8'12; 8'16; 8'18; 4'18.
Roll, 10 Ft. Bertsch Slip, 18 Gauge $225.00
Brakes Power, 12'½"; 3'10"; 8'3/16"; 8'¼".
Rapid Slitter, No. 255 Pexto 16 Gauge $50.00
Punch, Pexto 15" throat $17.50
Angle Iron Outfit, Whitney $90.00
Mighty Midget Unishear $37.50
Electric Drills, Black & Decker, ¼"; ½"; ¾".
Spot Welder, New 20 Ga. $95.00

Don't let your Surplus Machinery stand idle. TRADE IT IN on Interstate Guaranteed Reconditioned Equipment. We carry America's largest stock Modern Machinery at prices that will suit your bank book. Let us quote.

NEW & USED — Send for Bulletin No. 835 listing modern requirements. ROLLS — SHEARS — BRAKES — PUNCH PRESSES BUTT, ARC & SPOT WELDERS — FOLDERS PRESS BRAKES — HAND MACHINES — STAKES — HAND & POWER

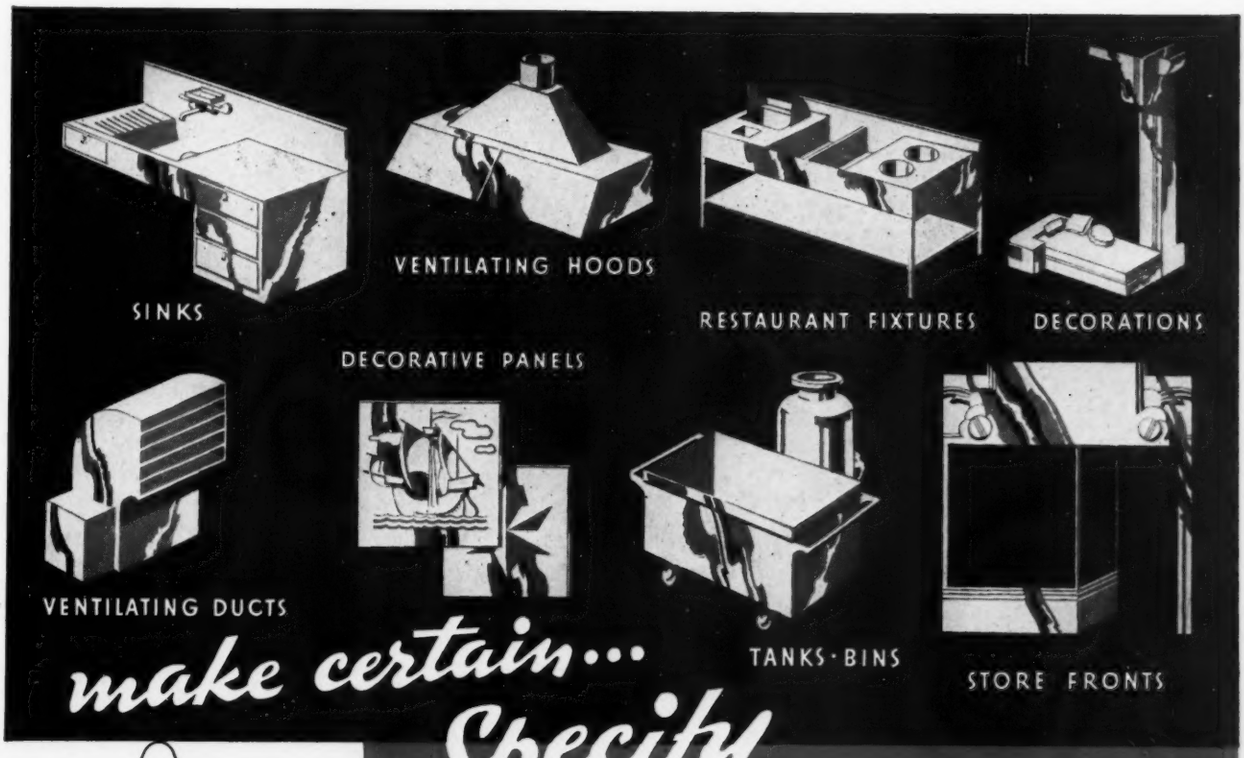
INTERSTATE MACHINERY COMPANY
130 S. Clinton St. - - - - - Chicago

Index to Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in alternate issues is marked with an asterisk.

June, 1935

If the Job calls for a Stainless Steel—



make certain... Specify

Allegheny METAL
CONTROLS CORROSION
THE SAFE METAL

ALLEGHENY METAL

THE TIME-TESTED STAINLESS STEEL

JUST A FEW OF THE HUNDREDS OF PRACTICAL APPLICATIONS FOR ALLEGHENY STAINLESS STEELS

Ventilators
Kitchen Sinks
Grills
Ventilating Ducts
Window Displays
Metal Ornamentation
Smoke Pipe
Pilasters
Railings
Entrances
Exhaust Systems
Store Fronts & Fixtures
Vats, Tanks of All Kinds, Etc., Etc.

"Made of ALLEGHENY METAL" constitutes the strongest recommendation for quality on any sheet metal job. And ALLEGHENY METAL is only one of ALLEGHENY STAINLESS STEELS . . . a complete group of corrosion and heat-resistant alloys, covering every industrial requirement. Their all-around advantages of beauty, permanence and workability have opened up entirely new fields for sheet metal men . . . their applications and uses are legion.

Moreover, ALLEGHENY STEELS are THE PIONEER STAINLESS STEELS! Allegheny Chrome-Iron (the first stainless steel) was introduced in 1922 and Allegheny Chrome-Nickel Alloy (Allegheny Metal) in 1925. Their unique physical properties have been tried and proved . . . that is why they enjoy the largest demand everywhere among sheet metal men and the trade.

Why not get YOUR share of the profitable possibilities of ALLEGHENY STAINLESS STEELS? Descriptive Bulletins will be gladly sent on request.

ALLEGHENY STEEL COMPANY

BRACKENRIDGE, PA.

Sales Offices and Warehouse Stocks in the Principal Cities; . . . Stocks carried by JOS. T. RYERSON & SON, INC. WAREHOUSES
Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, and Jersey City . .
Union Hardware & Metal Co., Los Angeles

(Allegheny Metal is manufactured pursuant to License from the Chemical Foundation, Inc., under basic patents No. 1,316,817 and No. 1,339,378)

Working Hand - in - Hand BUILDS SALES

Co-operation in selling—a basic reason why you will do better with The Complete Mueller Line.

Our dealers get real factory support—active hand-in-hand work when co-operation is needed to close a fat contract.

When engineering service will help you land a heating or air conditioning job, the Mueller staff is ready and eager to work with you.

Then, too, you have MMFP (Mueller-Milwaukee Finance Plan) to smooth the way to sales. You can offer One to Three Years to pay —No Down Payment—Easy Terms. A winning proposition.

WE ARE CO-OPERATING BETTER HOUSING PROGRAM

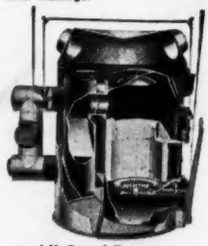
Get the facts—send for our catalog of furnaces, boilers, and air conditioning equipment for all fuels and all size residences.

L. J. MUELLER FURNACE COMPANY, Dept. AA6, Milwakee, Wis.

Branches and Distributors in Key Cities Everywhere

Mueller "F" Series
Mueller Full Front Furnace for volume business. Made in six sizes, both single and double door types. It's heavier — has higher "Standard Code" ratings—yet no higher in price. Also available in pipeless, three-way and room heater types.

Mueller "A" Series
—all cast iron—for those who want the best in a coal or oil burning unit. Seven sizes—20 to 33 inch firepots. Also available with round galvanized casings.



All-Steel Furnace
Mueller all-steel, riveted and welded furnaces for coal or oil burner—seven sizes, 20 to 34 inch drums, including Giant Radiator type. Dome protected by cast iron bell.

MUELLER – MILWAUKEE